

APR 28 1917

UNIV. OF MICH.
LIBRARY

Railway Age Gazette

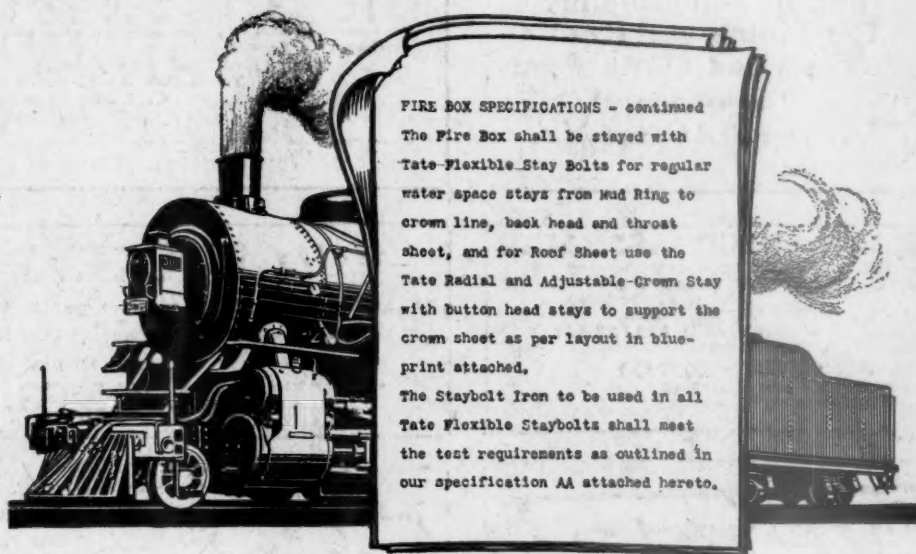
FIRST HALF OF 1917—No. 17

SIXTY-SECOND YEAR

NEW YORK: Woolworth Building
CHICAGO: Transportation Building

NEW YORK—APRIL 27, 1917—CHICAGO

CLEVELAND: Citizens Building
WASHINGTON: Home Life Bldg.



SPECIFY "TATE FLEXIBLE STAYBOLTS" FOR ALL NEW EQUIPMENT and FOR ALL RENEWED FIREBOXES

We know of no instance where the Tate Flexible Staybolt was specified and used in new locomotive boilers, but that the greatest mileage and the lowest cost of firebox maintenance was invariably obtained throughout actual practice or road service.

Staybolt breakage and firebox repairs are largely responsible for the numerous delays that continually occur, and the expense resulting from these conditions is greatly reduced by the use of Tate Flexible Staybolts, and we recommend their application with the firm assurance that such will add much to the productive value of the locomotive.

IN USE ON OVER 500 RAILROADS

FLANNERY BOLT COMPANY

VANADIUM BUILDING, PITTSBURGH, PA.

B. E. D. STAFFORD, Gen. Mgr.

J. ROGERS FLANNERY & COMPANY, Selling Agents

Vanadium Building, Pittsburgh, Pa.

GEO. E. HOWARD
Eastern Representative

W. M. WILSON
Western Representative

COMMONWEALTH SUPPLY CO.
Southeastern Representatives

CHAS. HYLAND
Boiler Expert



CHASE GOAT BRAND PLUSHES AND CHASE IMITATION LEATHER

Quality standards are fixed and dependable

Several months ago a seat cover of Chase Plush was sent to us with the statement that it had been in continual service for twenty-four years.

L. C. CHASE & CO.

89 Franklin Street, BOSTON. 326 W. Madison Street, CHICAGO. 321 Fourth Avenue, NEW YORK. 303 Majestic Bldg., DETROIT.

THERMOSTATIC CONTROL
PRESSURE VAPOR
GOLD SYSTEMS
COMBINATION ELECTRIC
HOT WATER-VENTILATION

IS YOUR HEATING MAINTENANCE CHARGE HIGH? WHY NOT APPLY A SYSTEM THAT WILL CUT THIS IN HALF?

Gold's Thermostatic Control System Saves 50% in Steam Consumption, Uses Less Pipe and Fittings—Positively Gives a Uniform Temperature.

Thermostatic Control Can Be Applied to Your Existing Systems.

GOLD CAR HEATING & LIGHTING CO., 17 Battery Pl., New York



Trunking and Capping Car Siding and Roofing Ties and Cross Arms

Inquiries Solicited

Louisiana Red Cypress Co.

New Orleans

La.

DICKINSON DEVICES

Cast Iron Smoke Jacks
Light Fire-Proof Smoke Jacks
Ventilators All Materials
Cast Iron Chimneys
Cast Iron Buildings
Telephone Booths

PAUL DICKINSON Inc., 3354 South Artesian Ave., Chicago

SARCO MINERAL RUBBER ASPHALTS

SARCO No. 6 Waterproofing
SARCO Bituminous Putty
SARCO S-M Paint
SARCO Refrigerator Compound
SARCO Mineral Rubber Floors
SARTAC-Damp-Proofing
SARCO R. S. A. Specifications
SARCO Roof Cement

SARCO PRODUCTS INSURE PURITY AND RELIABILITY
Promptness—Service—Efficiency



SARCO PETROLEUM PRODUCTS COMPANY
Formerly STANDARD ASPHALT AND RUBBER CO., and
THE PETROLEUM PRODUCTS CO.
CHICAGO



Specify BUCKEYE JACKS

and be assured that you are getting the best jack in design, capacity and longevity that is manufactured

Send for Catalogue

BUCKEYE JACK MFG. CO. ALLIANCE OHIO

Universal

Cast Steel Drawbar Yokes

Draft Lugs

Cast Steel Draft Arms or Sills

Tandem Draft Gear
**REENFORCE-
MENT**



Triples Capacity
reduces recoil 25%
(for old or new cars)

Universal Draft Gear Attachment Co.
Railway Exchange Building
CHICAGO



FOR elevators, dredges, lumbering, mining, oil-well drilling, suspension bridges, stump-pulling, cranes, derricks, ships' rigging and every other form of wire rope use.

Ask for illustrated catalogue

American Steel & Wire Company

Chicago New York Cleveland Pittsburgh Worcester Denver

Export Representative: U. S. Steel Products Co., New York

Pacific Coast Representative: U. S. Steel Products Co.

San Francisco Los Angeles Portland Seattle

Better Observance of Signals Is Obtained By Using Cab Signals

As developed in connection with the Simmen System, cab signals are practical, reliable, low in first cost and maintenance cost, and adaptable to a variety of traffic conditions.

**Simmen Automatic
Railway Signal Co.**

1575 Niagara Street
Buffalo, N. Y.

Write for our booklet
"Progressive Signaling"

Railway Age Gazette

Volume 62

April 27, 1917

No. 17

Table of Contents

EDITORIALS:

Another Evidence of Railroad Preparedness.....	871
Railway Conventions Postponed.....	871
Hold-Up Game to End.....	871
Standardization of Office Supplies.....	871
A New Zealand View of Government Ownership.....	872
The Mechanical Engineer and the M. C. B. Assn.....	872
British and American Railways in War Time.....	872
Opportunities for Important Work.....	873
Where Information Is Needed.....	873
Contest on Car Interchange.....	874
*New York Central.....	874, 919
Michigan Central.....	876, 921
Cleveland, Cincinnati, Chicago & St. Louis.....	877, 923

NEW BOOKS:

* Illustrated.

MISCELLANEOUS:

Increased Rates May Be Allowed July 1.....	878
Telegraph Superintendents' Meeting.....	881
*New Bridge Over the Schuylkill at Manayunk.....	883
Railroads Tackle the Food Problem.....	884
Legislation Affecting Railways.....	886
Canadian Railways in the Fiscal Year 1916; J. L. Payne.....	887
*Signal Lamps With Reflectors.....	889
Pere Marquette and Cincinnati, Hamilton & Dayton.....	891
Organization of a Military Railway Regiment.....	895
An All-Ingot Test for Steel Rails; Geo. F. Hand.....	896
*Heavy Locomotives for the Lehigh Valley.....	897
Reducing Breaks-in-Two on the Santa Fe.....	900
Operation of British Railways in the War; Julius H. Parmelee.....	901
Railway Water Supply; C. R. Knowles.....	903
*E. J. Pearson Succeeds Howard Elliott on the New Haven.....	905
GENERAL NEWS SECTION:.....	907

Every day brings forth new evidence of the forehandedness of American railroads in preparing for a war emergency.

Another Evidence of Railroad Preparedness

The latest development which has come to light is that a military railway regiment is in process of organization under the direction of S. M. Felton, president of the Chicago Great Western and consulting engineer and advisor to Brigadier General Black, chief of engineers, U. S. A. The plans for the formation of the new army unit, which are given in detail elsewhere in this issue, were under way for several months previous to the declaration of war and were ready to put into immediate execution at the time the United States entered the ranks of the belligerents. The regiment will consist of six companies recruited from railroads entering Chicago, and each company will be expected to be capable of constructing or operating any line that military movements may necessitate.

The action of the American Railway Association in postponing its spring meeting indefinitely will undoubtedly be fol-

Railway Conventions Postponed

lowed by the other railway associations which are scheduled to hold their annual meetings during the next few months. Nothing must be allowed to interfere with the most hearty and thorough co-operation of the railways with the government in this time of national crisis. The Association of Railway Claim Agents, which was to have met at Cincinnati during the middle of May, has already decided to postpone its convention indefinitely. The executive committees of the Master Car Builders' and Master Mechanics' Associations will meet in Chicago on Monday next with a view to taking similar action. The Railway Supply Manufacturers' Association, which provides the exhibit for these conventions, last week decided to postpone its annual exhibition for a year. The Air Brake Association has gone so far with its plans for the annual meeting at Memphis next week that it was decided to go forward with the convention. It is doubtful whether it will be advisable for any of the organizations in the railway field to hold other than local meetings unless they should be

found necessary for military reasons, and have the approval of the central board of railway executives, which is in complete charge of the railways during the war.

Hold-Up Game to End?

A jury in a court at Belleville, Ill., recently returned a verdict clearing the Baltimore & Ohio of responsibility for the death of a farmer whose automobile was struck by a B. & O. train last September. The widow had sued for \$3,000, but the jury refused to grant her damages, on the ground that the crossing was clear and the deceased was killed due to his own negligence. In view of the fact that the press of Belleville and public sentiment there has long been antagonistic to the railroads, the verdict is a source of considerable encouragement. For many years the attitude of juries toward railroads in damage suits has been prejudiced by sympathy for the plaintiff and the presumption that the corporation, being rich, would not miss the inconsiderable sum involved in the suit. The Belleville case, it is hoped, is the harbinger of a new era when railways will no longer be considered the legitimate prey of all who may think they have cause to bring damage suits against them.

Standardization of Office Supplies

Railroads generally have confined themselves in the standardization of supplies and materials to the larger and more important items which seem to offer possibilities for the greater savings. Little or no attention has been given to some of the smaller items which, while almost insignificant in themselves, bulk up as a large factor in the aggregate. By using a large number of different sizes or makes where a few would suffice the purchasing and storekeeping problem has been complicated and it has not been possible to make the purchases at the most advantageous terms. Investigation on one railroad, for instance, developed the fact that three sizes of common pins were being purchased where one would suffice. A large number of varieties of paper fasteners were being ordered where three or four would be sufficient. The same thing was true of rubber bands, lead pencils, erasers and

other office supplies. An industrial organization maintaining many offices found the same condition existing a year or two ago and went to work scientifically to improve conditions; it obtained remarkable results both in the saving of money and in the more efficient use of materials. In the first place a thorough canvass was made as to the variety and use of each article, and in many cases physical and chemical tests were made. The sizes and make or grade of material were finally selected, not by guesswork, taste or individual opinion, but on a strictly scientific and accurate basis. There is a big field here which has been very largely overlooked by the railroads, a few of which have exceptional opportunities for making such investigations with their testing plants and other facilities for research.

In Canada the question of government ownership is under serious consideration. Apropos of the discussion in that

A New Zealand View of Govern- ment Ownership

country, Sydney Smith of Rotorna, New Zealand, under date of January 22, has written a letter to the Financial Post of Toronto regarding the results of government ownership in New Zealand.

The letter is as follows:

I have read in the Post of the movement for the nationalization of the Canadian railroads. If you want a convincing argument against state ownership of railroads investigate the Australian and New Zealand railroads. I have traveled in the five continents and have never experienced a worse rail service than the New Zealand or a more costly service to travel or freight on. Freights and passages (freight and passenger rates) are of the highest, the service is of the worst, and the employees are the most casual. The expresses between the capital city, Wellington, and the largest city, Auckland, average just over 20 miles an hour, the trains are filthy, and porters are practically unobtainable. When one thinks of your magnificent C. P. R. service and all that it has done for Canada, one is compelled to write and call "Cave" before you change. You will never improve it under state ownership and are fairly certain to destroy its efficiency. To improve the efficiency of the C. P. R. would be to improve the efficiency of Canada.

One of the main arguments used in favor of government ownership in Canada and the United States is that the public is satisfied with its results wherever it has been tried. Mr. Smith's letter shows that satisfaction with the results obtained is not unanimous in New Zealand.

A correspondent has criticised the editorial entitled "Mechanical Engineers Get Busy," which was published in the

The Mechanical Engineer and The M. C. B. Ass'n.

Railway Age Gazette of April 13, on the ground that a similar statement of facts concerning the activities of the railway mechanical engineer in the Master Car Builders' Association

would show a very different state of affairs. The basis for his argument seems to be that the latter association is considered more important than the Master Mechanics' Association because the railways are bound by its action in the interchange of cars and the use of standards and that therefore the mechanical department officers are forced more actively to participate in its work. At the first glance the assertion appears to be correct, for of the 18 important committees of the Master Car Builders' Association for 1917, including the executive and arbitration committees, 14 have included in their membership officers with the title of chief mechanical engineer, mechanical engineer, or assistant mechanical engineer; indeed, three of the committees have men with these titles as chairmen. Although four of the committees have no officers with these titles included among their members, three other committees have more than one member with such titles, so that there is an average of one mechanical engineer for each of the important committees. These 18 committeemen, however, represent only 10 different individuals, as some of them serve on two or more committees. Of the 67 men listed on the railroads of the United States with the above mentioned titles only 32 are members of the Master Car Builders' Association and only 20 were recorded as being present at the 1916 convention. Of those present only six took any part in the proceedings. In some respects,

therefore, the showing made by the mechanical engineers in the work of this association is not as favorable as in the Master Mechanics' Association, poor as it is in the latter organization. These conditions, coupled with the facts presented in our editorial columns during the past four weeks, clearly indicate two things: On one hand, the railroads are missing great opportunities in not making better use of their mechanical engineers by giving them more responsibility and better facilities to work with, while, on the other hand, the mechanical engineers themselves are more or less asleep as to the real possibilities of their positions.

BRITISH AND AMERICAN RAILWAYS IN WAR TIME

SOME aspects of the effect of war on the British railways, which are especially interesting in their relation to the situation of the railways in this country, are outlined in the article in this issue by Julius H. Parmelee. Although the plan under which the British railways are operating during the war differs from that which has been adopted in this country, many of the conditions which are now being faced here have had their effect in Great Britain also. The British government took over the railways of England and Wales at the beginning of the war in accordance with a law passed many years before, and has been operating them through a committee of railway officers, guaranteeing net earnings equal to those of the period before the war. In this country the plan is to have the roads operated for the benefit of the government by a committee of railway executives but without actual government possession or guarantee.

The British railways in the year before the war had to pay a large advance in the wages of their employees in order to avert a threatened strike, which was settled under an agreement by the government that their rates should be advanced proportionately. The American roads are now paying advanced wages to their train employees as the result of a settlement effected by the combined exertions of the President, Congress and Supreme Court and the Council of National Defense, but they have not yet been even promised an increase in rates to meet it. The British roads have also had to meet still further increases in wages during the war and have had their expenses increased in many other ways which have already and will in the future affect the American roads similarly. Handling war traffic is expensive and the prices of fuel and of materials, as well as wages, have increased enormously in England just as they have here.

In Great Britain it has not been necessary for the roads to ask increases in their rates for service to offset these increased expenditures because the government has not only made up for any decreases in net earnings under its guarantee but it has recently agreed to provide for their increased interest payments, which represent another instance of the similarity of conditions there and here. The shippers and the public generally are, therefore, paying what is necessary to keep the railways in a proper condition to serve the country but in the form of taxes to the government instead of in the form of rates. Passenger fares have been increased, but not directly for the purpose of increasing revenues.

In this country the railways have no government guarantee, although they are just as effectively at the service and under the control of the government as are the roads of Great Britain, but their increases in wages and other expenses as well as the higher interest charges they are required to pay for capital must be met, if they are to render the service that is expected and required of them. They have, therefore, asked to be allowed to meet them in the same way that other industries have dealt with the same conditions, by increasing the price of what they sell. The increased cost of railroading, like the increases in prices of all kinds, will be distributed eventually over the general public. The difference between this and taxation is that it will be paid for

service and in proportion to the amount of transportation service received.

If those who are opposing an increase in the price of transportation should succeed in their efforts, the inevitable result will be a reduction in the quality or even the quantity of the product, which will be more expensive in the long run than the amount which is necessary to offset the higher cost of transportation.

OPPORTUNITIES FOR IMPORTANT WORK

AT a meeting of the Board of Direction three weeks ago, the American Railway Engineering Association created two new committees whose work should greatly increase the value of this association to the railways. One of these will devote its attention to studies of economics of Railway Operation and the other to Economics of Maintenance of Way Labor.

In common with most of the other organizations of railway men the American Railway Engineering Association has devoted almost all of its time in the past to studies of materials and to the preparation of standard designs and specifications for them. Within the last few years there has been an increasing demand for information concerning efficient methods of performing work. In operating matters the committee on Economics of Railway Location has made some careful studies of the tractive effort of locomotives, and of train loading, etc., but the work of this committee has been more from the standpoint of the establishment of the proper grade lines for extensions and for the improvement of old roads, etc. A vastly broader field is opened to the new committee on Economics of Railway Operation. While the American Railway Engineering Association is primarily an engineering rather than an operating organization, many operating officers are enrolled in its membership, and the problems of the two departments are becoming more closely related as greater attention is being paid to scientific analyses of operating problems. By attacking these problems from this angle, the engineering association should supplement rather than duplicate the excellent and constructive work which the American Association of Railroad Superintendents and other operating organizations are now doing.

As an illustration of the work which will come within the province of this new committee, the establishment of an eight-hour basic day in train service raises the question on many divisions as to the relative economy of loading trains fully with the resultant heavy overtime, of decreasing the tonnage to get them over the road more nearly within eight hours or of providing more second tracks and other facilities to reduce the delays and dead time to the minimum. While conditions will differ widely on different engine districts, depending on the density and character of the traffic, the grade line, the length of the district and the cost of improvements, studies of a few typical districts will bring out information of great value. The effect of the eight-hour basic day law on the lengths of engine districts is another problem. The location of passing tracks deserves more study from the operating standpoint. In some instances where siding locations have been studied from the standpoint of their effect on track capacity and recommended changes have been made the capacity has been increased materially with relatively small expenditure.

These are typical of many problems which this committee can analyze and thereby assist in promoting efficient railway operation.

The second committee has an equally important field to study. Much has been written recently regarding the necessity of giving more attention to the human element in the conduct of maintenance of way work, yet almost no detailed studies of maintenance of way labor problems have been made up to the present time, in spite of the fact that the railways of this country spend over a half million dollars a day

for such labor. The character of the men employed has deteriorated steadily from year to year until at the present time the railways are securing less work per dollar expended for track labor than at any time in their history. Not all of this is the result of changing industrial conditions beyond the influence of the roads and it is highly important from the standpoint of the railways themselves that this subject be studied intelligently before it becomes even more complicated.

The American Railway Engineering Association is to be commended for undertaking the investigation of these important subjects. While, because of the magnitude of the field presented, results may come slowly at first, they should be of great value to the roads when secured.

WHERE INFORMATION IS NEEDED

THE Interstate Commerce Commission probably should investigate the proposed increase in freight rates, if only for the purpose of furnishing much needed information to certain members of the United States Senate. An investigation for this purpose need not be elaborate or consume many months. A clerk from the accounting department of the commission, or even a bright office boy, could easily save about \$200,000,000 of the amount which Senator Hoke Smith of Georgia tries to make the Senate and the public believe would be added to the cost of living by a 15 per cent increase.

In a resolution introduced last Friday to direct the Senate Committee on Interstate Commerce to investigate the proposed increase Senator Smith calculated the advance to be \$406,000,000 a year. This figure he arrived at by taking the freight revenues of the railroads for the last six months of 1916, multiplying them by two and taking 15 per cent of the result. The actual earnings for a whole year were not big enough to suit his purpose. The freight earnings for the entire calendar year 1916 for the roads earning over a million dollars annually, which were the roads whose figures he used, actually amounted to \$2,573,000,000 as against \$2,712,000,000 arrived at by his method. On Saturday he amended his resolution to request the committee to report a measure preventing the increase in rates until after full hearing, and on Monday he offered another directing the Interstate Commerce Commission to investigate it, which the commission has already announced its intention of doing, but before writing the last resolution he had discovered another nefarious method of taxing the consumer which would also make his resolution sound still more impressive. In this resolution he said that "with the increase of local rates to follow, the 15 per cent increase will amount to over half a billion dollars." Senator Smith entirely overlooks the fact that he has already included all local rates, as well as the rates which the railroads propose to advance less than 15 per cent, in his \$406,000,000.

Even if the Interstate Commerce Commission should grant all the railroads ask there would still be the state commissions to reckon with before local rates can be affected. Some of the states have not yet allowed to go into effect on traffic within their borders the 5 per cent increase allowed by the Interstate Commerce Commission in 1914 on about half of the interstate freight of the eastern railroads. Senator Smith also says in his resolution that "within the past three years the railroads in the central division have been given an increase of freight rates of 5 per cent and the railroads in the western division an increase amounting to between 5 and 10 per cent and the railroads in the southeastern division an increase amounting to between 15 and 20 per cent." Any rate clerk of the Interstate Commerce Commission could inform him that these percentages applied only on a part of the traffic of the roads involved.

If the Interstate Commerce Commission could arrange to conduct a course of instruction for the benefit of the lawmakers some good might be accomplished.

CONTEST ON CAR INTERCHANGE

NEVER before have the railways faced as difficult a problem in car distribution as during the last few months. The unusual movement of cars to the eastern seaboard and the delay in unloading and releasing them there soon brought on a congestion without precedent in that vicinity, and at the same time created one of the most serious car shortages ever experienced in other parts of the country. The time-honored interchange rules, which had been in effect since 1893, broke down under these abnormal conditions and the disregard of all regulations governing the return of cars to owning lines became general. In the emergency the American Railway Association and the Interstate Commerce Commission hurriedly prepared new rules which are aiding somewhat in relieving the situation, but which are uneconomical in operation and are also far from perfect in other respects.

Recent developments culminating in our entrance in the European war, will probably complicate this situation still further by creating an even greater demand for cars for the transportation of supplies to the eastern seaboard. The car statement of the American Railway Association just issued shows a total shortage of 143,059 cars on April 1, the largest ever reported, while on this same date 89,371 loaded and empty cars were accumulated at various points from which they could not be moved.

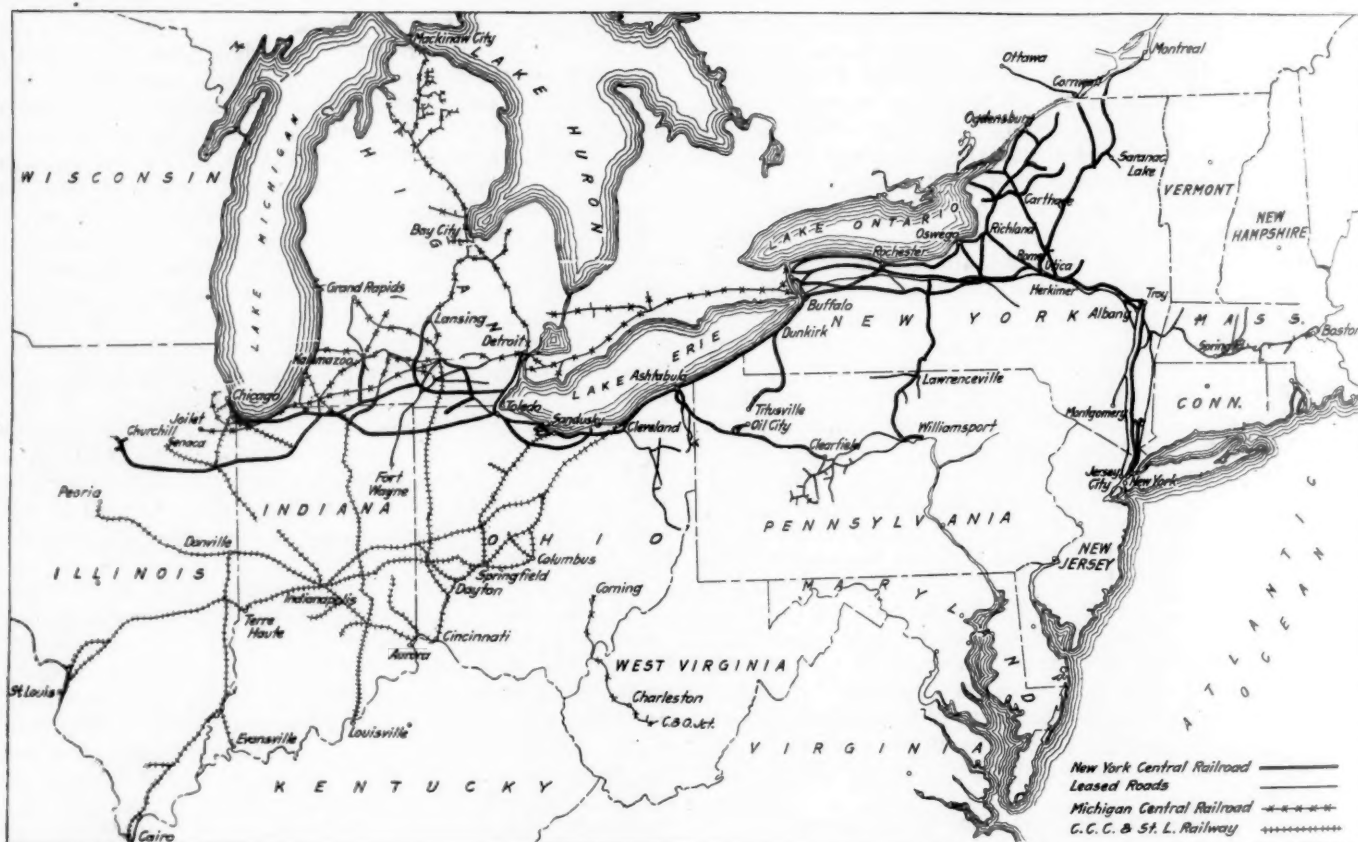
The experiences through which we have been and are still passing, demonstrate the importance of adequate interchange rules to the railways and also to the shippers. The time is now ripe for serious, concentrated study of the entire situation

rules should make it easy for every road to do right and extremely difficult for any to do wrong. Such rules will not necessarily be complicated, but they must be comprehensive.

As a stimulus to the development of such a set of rules a railway man interested in this subject authorizes us to offer a prize of \$50 for the best concrete plan of car interchange between railroads, calculated to give working effect to the principle laid down by the American Railway Association that each road is entitled to the possession of cars equal to its ownership. The *Railway Age Gazette* is glad to offer a second prize of \$35 for the next best paper submitted on this subject, and will also pay its regular space rates for all other papers which are accepted by it for publication and printed. All papers to be entered in the contest on car interchange should be mailed to the editor of the *Railway Age Gazette*, 608 South Dearborn street, Chicago, before June 10.

NEW YORK CENTRAL

THE New York Central earned over \$200,000,000 gross in 1916 and operated at a ratio of expenses to gross of 64.36. After paying fixed charges and rentals there was \$45,659,000 available for dividends, or over 17 per cent on the outstanding stock. Of the increase of \$33,673,000 in gross as compared with 1915, and a considerable increase in dividends received over half—\$17,948,000—was saved for net corporate income. The New York Central in 1916 earned its 5 per cent dividend more than three times over and yet an offering of only \$25,000,000 of stock to stockholders at par had to be withdrawn because New York Central stock dropped below par in the open market.



The New York Central, the Cleveland, Cincinnati, Chicago & St. Louis, and the Michigan Central

leading to the preparation of rules which will not fail in another such emergency and which will afford fair treatment to every road, insuring to those lines which have been forehanded enough to provide a sufficient number of cars for their local traffic and for their quota for through traffic a supply sufficient for their needs. As one railway man has said, these

A close study of this New York Central situation would throw a world of light on the entire railroad situation as it exists today in the United States. Here is a 5,689-mile road, with its main line running from New York to Chicago, earning about \$35,000 a mile, operating at a low ratio of expenses to earnings and having a very heavy average train-

load of freight—847 tons—in 1916; having a fine physical property maintained at a high standard; and, moreover, a company which through improvement in operation in the last few years has overcome a financial situation that appeared to be rather serious, and yet this company is unable to sell a 5 per cent stock, on which it is earning 17 per cent, to investors at par. Is the explanation of this that the condition of the investment market is such that investors would not take a 5 per cent stock of any company at par, notwithstanding the fact that it is earning 17 per cent on the stock; or that the investor would not take any *railroad* stock under these conditions at par; or is there something peculiar to the New York Central situation itself which makes investors timid?

No one of these considerations, probably, is the sole explanation; all three of them are contributory factors. It is undoubtedly true that investors would look at a railroad stock, paying 5 per cent and earning 17 per cent, much less favorably than they would at many other corporations' stocks; and it is also undoubtedly true that the New York Central situation reflects conditions of railroading in the East that account for this discrimination against railroad stocks as an investment. Besides this, there are certain factors peculiar to the New York Central itself which have their influence. President Smith suggests this in the paragraph in his annual report in which he says: "The impressive fact is, therefore, that for additional growth of traffic beyond that witnessed during the year 1916 there are required in many places large investments in terminals and other facilities that will need extensive financial provision when reached."

With the traffic of the year 1916 the New York Central is approaching or has reached the situation which the Pennsylvania found itself in at various times in the past; for instance, in 1906, and prior to that time, when it had to undertake such extensive improvements and additions as the building of its low grade line from Harrisburg to Philadelphia. In 1916 the New York Central terminal facilities, and probably in some places main line tracks, were being worked to the full of their economical capacity. The Pennsylvania was enabled to raise vast sums of new capital to make the additions to its terminal facilities and to its main line tracks because it had put into the road for years a dollar of additional investment from surplus earnings for every dollar of surplus earnings paid out in dividends, and because investors still had hopes that new money put into railroads would show an increase in net earnings proportionate to the investment. The facts proved otherwise. Even the Pennsylvania is not earning anything like an adequate return on the investment made in the property since 1906. It is not very surprising, therefore, that the New York Central now, after ten years of disillusionment of investors in railroad stocks and securities, finds it impossible to sell a 5 per cent stock at par. And yet New York Central financing most assuredly ought to be done through the issue of stock and not through the sale of additional bonds.

There are outstanding in round numbers about \$250,000,000 of New York Central stock and \$673,000,000 of mortgage bonds, debentures and equipment trusts. Sound financing of railroads most emphatically requires that this proportion of bonds to stock shall not be increased. The New York Central has just succeeded in weathering a serious situation. Prior to the outbreak of the European war it had piled up a very large amount of debt, part of it loans and bills payable and part of it temporarily financed by short-term notes. Through consolidation with the Lake Shore the sale of \$40,000,000 refunding and improvement 4½ per cent bonds in 1914 and \$100,000,000 20-year 6 per cent convertible debentures in 1915, and through a marked improvement in the ratio of expenses to revenues, credit for which must be given to the present officers of the operating

department, the company has got itself back into a sound condition.

This year the carrying of \$30,693,000 surplus, after the payment of dividends, and the setting aside of \$2,500,000 to equipment depreciation account in addition to the charges to operating expenses for depreciation, has immensely improved the financial standing of the company. At the end of 1916 there was only \$4,502,000 loans and bills payable and the company had \$13,719,000 cash on hand. During 1916 the New York Central sold the majority stock of the New York, Chicago & St. Louis, receiving \$8,500,000, of which \$2,000,000 was in cash and \$6,500,000 in notes. This sale was a good piece of business. The New York Central needs the \$8,500,000 and did not need the New York, Chicago & St. Louis.

Even, however, with all of the adverse conditions affecting railroad stock as an investment, if there was a strong likelihood that the New York Central could continue over a series of years to earn 17 per cent on its stock there would be entire justification for raising the dividend rate to 7 or even 8 per cent and selling stock on this basis to stockholders; but the prospects of a continuation of the present rate of net corporate income are very poor indeed. Business is not going to stand still. If with all our participation in the war the New York Central is called upon to handle an even larger business than it did in 1916, the law of diminishing returns, the working of which has been demonstrated so often in recent years, will adversely affect the New York Central's net. If business falls off the present rate of net cannot pretty surely be continued. In addition to this there is the large increase in operating expenses which will be shown this year as compared with 1916 through the operation of the eight-hour law. This increase in expenses without any additional work being done would add from one and a half to three million dollars to the transportation expenses, and to this would have to be added probably further increases in the cost of fuel and materials and increases in the rates of pay for labor other than train and enginemen.

From an operating standpoint, the New York Central in 1916 made as fine a showing as it did from a financial point of view. The total tonnage of revenue freight carried passed the one hundred million mark, being 106,408,000 tons, an increase of 18,579,000 tons. The average haul—201 miles—remained the same in both years. The average revenue trainload in 1916 was 766 tons, and the average total trainload, including company freight, was 847 tons, an increase as compared with 1915 of over 26 tons. Heavier carloading was the way this result was achieved. The average loading per loaded car-mile in 1916 was 23.63 tons as against 22.54 tons in 1915. The average number of cars per train was 54.23 in 1916 as against 56.70 in 1915.

There was a large increase in passenger business as well as in freight business. The total number of revenue passengers carried one mile was 2,353,000,000, an increase of 235,000,000 over 1915. The average revenue per passenger per mile was slightly better in 1916 than in 1915, being 1.934 cents as against 1.894 cents in 1915.

The increase in tonnage of freight carried was largely accounted for by increases in amount of products of mines and of manufactures. The tonnage of bituminous coal carried amounted to 28,801,000 in 1916, an increase of 4,425,000. The tonnage of ore amounted to 9,899,000, an increase of 3,036,000. The tonnage of manufactures amounted to 29,096,000, an increase of 6,264,000.

The New York Central got considerably more work out of its locomotives in 1916 than in 1915; the average mileage per locomotive was 31,681 as against 26,123 miles. It was forehanded in providing new locomotives and in scrapping old ones. In 1916 160 locomotives were added and 217 were retired.

The following table shows principal figures for operation

in the calendar year 1916 as compared with the year 1915:

	1916	1915
Mileage operated	5,689	5,640
Freight revenue	\$127,865,102	\$104,278,092
Passenger revenue	45,521,329	40,107,753
Total operating revenues	201,585,049	167,912,333
Maintenance of way and structures	18,965,061	17,133,450
Maintenance of equipment	35,995,816	31,628,858
Traffic expenses	2,897,683	2,645,373
Transportation expenses	64,950,528	51,879,176
General expenses	4,332,810	3,869,764
Total operating expenses	129,738,369	109,394,345
Taxes	8,481,549	8,324,326
Operating income	63,344,017	50,180,458
Gross income	85,967,446	66,809,329
Net income	45,659,217	27,711,474
Dividends	12,466,611	12,466,484
Equipment depreciation account	2,500,000	.....
Surplus	30,692,606	15,244,990

MICHIGAN CENTRAL

WITH the exception of a disproportionate increase in yard expenses, the Michigan Central in 1916 made a very creditable showing in handling a great increase in traffic. Ton mileage of revenue freight in 1916 totaled 4,173,000,000, an increase of 32 per cent as compared with 1915, and passengers carried one mile totaled 508,993,000, an increase of 8 per cent. Transportation expenses amounted to \$16,407,000, an increase of 22 per cent; but of the approximately \$3,000,000 increase in transportation expenses, \$450,000 was in wages of yard conductors and brakemen, \$304,000 in fuel for yard locomotives, \$230,000 in wages of yard enginemen, and \$105,000 in wages of yardmasters and yard clerks. Another \$526,000 is accounted for in increases in wages of station employees. This latter, of course, simply reflects the necessity which the company was under for raising the wages of this class of employees in competition with automobile and other manufacturing concerns and with farmers. The Michigan Central was fortunate in having no increase in 1916 in the price which it had to pay for fuel coal, the average cost of fuel per ton being \$2.16 in both years. Presumably the explanation of this is that the Michigan Central had contracts which carried it through 1916 at rates for coal prevailing before the large increases which have taken place in coal prices.

With an increase of 32 per cent in ton mileage there was an increase of only 17 per cent in freight train mileage, the total in 1916 being 6,669,000. The average total trainload, including company freight, was 606 tons in 1916, as against 530 tons in 1915, an increase of 76 tons. This is a very good increase; in part it was made possible by a better balancing of traffic, apparently, the average number of loaded cars per train being 32 in 1916 as against 30 in 1915, and the average number of empty cars per train being 12 in 1916 as against 14 in 1915. There was a good improvement in car loading, the number of tons of all freight per loaded car being 19.08 in 1916 and 17.69 in 1915. The average length of haul of revenue freight was 167 miles in 1916 as against 157 in 1915.

The total tonnage of freight carried in 1916 was 24,948,000, an increase of 4,444,000. The principal increases were in tonnage of bituminous coal—1,015,000—the total being 4,778,000 in 1916; in the tonnage of lumber—317,000—the total in 1916 being 2,165,000; and in nearly all classes of manufactures, especially machinery, bar and sheet metal, and wagons, carriages and tools.

The increase in passenger traffic, despite the competition of the automobile, reflects directly in the case of the Michigan Central the increase in prosperity of the territory served. The Michigan Central gives Detroit a very high class of passenger service and the growth in wealth of Detroit needs no comment. The prosperous farmer in the State of Michigan allowed himself this year a trip East or to Chicago for

the first time, possibly, in some years. The immensely increased distribution of goods to retail stores brought with it a very considerable increase in salesmen's travel.

On the whole, the financial results of the year 1916 for the Michigan Central were exceedingly good. Total operating revenues amounted to \$46,419,000, an increase of \$9,878,000. Of this increase, \$4,791,000 was saved for operating income, the total in 1916 being \$14,076,000. There was an increase of \$708,000 in the debit balance of hire of equipment, the total net charge on this account against the Michigan Central's income in 1916 being \$2,274,000. There was also an increase of \$379,000 in interest on funded debt, the total in 1916 being \$1,768,000. There was available for dividends in 1916 \$6,837,000, as against \$2,927,000 in 1915. The Michigan Central is paying 4 per cent dividends, which call for \$750,000.

In 1916 \$5,166,000 was spent on maintenance of way. This is an increase of \$633,000, and in considerable part is accounted for by the two items, roadway maintenance and track laying and surfacing. In other words, the prices which had to be paid for track labor were very much higher in 1916 than in 1915. The Michigan Central is beginning now to lay 105-lb. rail, 8,825 tons of it being laid in 1916 and 8,303 tons of 100-lb. rail. In 1915 14,426 tons of 100-lb. rail were laid. About the same number of ties were laid in 1916 as in 1915, but a considerably larger proportion was oak and a smaller proportion treated ties. The average price per tie at the distributing point was 80 cents in 1916 and 82 cents in 1915.

Maintenance of equipment cost \$6,675,000, an increase of \$910,000, principally accounted for by increased expenditures for repairs of freight cars, larger charges for depreciation and somewhat larger charges for repairs of locomotives, but not an increase in proportion, in this account, to the increased mileage. The average mileage per locomotive in 1916 was 32,958, and in 1915, 27,644. The cost of repairs per steam locomotive-mile was 7.61 cents in 1916 and 8.32 cents in 1915. It is interesting to note the cost of repairs of electric locomotives, which are used for all trains through the Detroit River tunnels. These costs averaged per mile per locomotive 3.74 cents in 1916 and 4.02 cents in 1915. Equipment in service at the beginning of the year included 740 locomotives. Fifteen of these were scrapped during the year and 28 new locomotives were put in service. There were 24,432 freight cars in service at the beginning of the year. Of these, 1,058 were retired and 5,294 new cars put in service. Of the new cars put in service 4,500 were all-steel box automobile cars. In addition, the Michigan Central has authorized the purchase of 6,000 freight cars and 50 passenger and baggage cars.

The principal changes in funded debt were the assumption of \$3,100,000 bonds of the Toledo, Canada Southern & Detroit, and the sale of \$4,500,000 equipment trust certificates, in part offset by the payment at maturity of \$1,351,000 equipment trusts.

The Michigan Central has outstanding \$18,738,000 stock and \$53,915,000 funded debt, which includes \$13,125,000 equipment trust certificates. In addition there are loans and bills payable of \$4,289,000; the one-year notes, which are included in loans and bills payable, for \$4,000,000 being renewed at the same interest—4½ per cent—for another year. Cash on hand at the end of 1916 amounted to \$3,094,000. The Michigan Central has made a refunding and improvement mortgage which is to secure not to exceed \$100,000,000 of bonds and ratably therewith the outstanding \$7,634,000 debentures. The \$4,000,000 notes which were renewed in 1916 fell due in March, 1917, and were paid, but at the time no announcement was made as to how this payment was financed. The directors have authorized the sale of \$8,000,000 of the new bonds, to bear 4½ per cent interest.

The following table shows the principal figures for operation in the calendar year 1916 as compared with 1915:

	1916	1915
Mileage operated	1,862	1,803
Freight revenue	\$29,810,576	\$23,050,122
Passenger revenue	11,146,342	9,386,421
Total operating revenue	46,418,790	36,540,665
Maintenance of way and structures	5,166,401	4,533,241
Maintenance of equipment	6,674,868	5,764,870
Traffic expenses	819,782	721,914
Transportation expenses	16,406,747	13,395,872
General expenses	878,085	742,458
Total operating expenses	30,646,261	25,727,487
Taxes	1,686,010	1,522,936
Operating income	14,076,169	9,285,601
Gross income	15,013,063	10,214,084
Net income	6,437,436	2,926,957
Dividends	749,520	749,520
Appropriated for additional investment in physical property	1,700,984	113,276
Appropriated for equipment depreciation account	500,000	
Surplus	3,886,932	2,064,261

CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS

THE Cleveland, Cincinnati, Chicago & St. Louis cut its operating ratio from 71.76 in 1915 to 66.89 in 1916. Notwithstanding a small increase in the cost of fuel per ton, expenses per train-mile were held down remarkably well. In 1916 they were \$1.77 as against \$1.71 in 1915, an increase of only 3.5 per cent. Freight-train mileage and passenger-train mileage increased in just about the same proportion, the total freight-train mileage in 1916 being 8,895,000, an increase of 863,000, and passenger-train mileage being 8,688,000, an increase of 758,000. There was an increase in the average revenue freight trainload of 65 tons, bringing the 1916 figure up to 654 tons. Total freight trainload, including company freight, averaged 678 tons in 1916.

Total transportation expenses amounted to \$15,816,000 in 1916, an increase of \$2,106,000, or 15 per cent. Total operating revenues amounted to \$46,678,000, an increase of \$8,314,000, or 22 per cent, the result of an increase of 1,085,000,000 tons carried one mile, or 23 per cent, the total ton mileage in 1916 being 5,848,000,000, and of an increase of 74,072,000 in passengers carried one mile, or 17 per cent, the total passenger-miles in 1916 being 499,540,000.

In transportation expenses the increase in cost of fuel, partly because of the increased locomotive mileage and partly because of a somewhat greater amount of fuel consumed per locomotive-mile in both freight and passenger service, accounted for \$427,000 of the total \$2,106,000 increase. The remarkable thing is that there were some decreases in transportation expenses due apparently to a very real improvement in the work of supervision and the work of certain classes of officers. Train despatching cost \$588,000 in 1916, a decrease of a little over \$5,000. Station supplies and expenses showed a slight decrease, as did also the cost of lubricants for locomotives, the cost of signal and interlocker operation, and the cost of telegraph and telephone operation.

Except in the amount spent for repairs of locomotives, freight cars and passenger cars, maintenance expenses increased comparatively little over 1915. There was spent on maintenance of way \$4,548,000 in 1916, an increase of only \$131,000. There was 19,449 tons of 90-lb. rail laid as against 17,541 tons laid in 1915; but there were only 870,000 new ties put in track as against 1,115,000 in the previous year. The average price at distributing points was 85.21 cents in 1916 and 85.50 cents in 1915. The total increase in maintenance of equipment expenses was \$1,199,000, the amount spent in 1916 being \$8,686,000. Repairs of locomotives cost \$2,596,000 in 1916, an increase of \$246,000, and repairs of freight cars cost \$3,112,000, an increase of \$472,000. The following table shows the percentage of each class of expenses to total operating revenues:

	1916	1915
Maintenance of way and structures	9.74	11.52
Maintenance of equipment	18.61	19.52
Traffic expenses	2.21	2.28
Transportation expenses	33.88	35.74

Miscellaneous operation	0.63	0.75
General expenses	1.99	2.21
Transportation for investment—Cr.	0.17	0.26
Total	66.89	71.76

The total tonnage of freight carried in 1916 was 32,902,000, an increase of 5,419,000. Bituminous coal furnishes a considerable proportion of the Big Four's tonnage. In 1916 14,509,000 tons of bituminous coal was carried, an increase of 1,957,000 tons. The tonnage of lumber carried was 2,176,000, an increase of 390,000 tons. There were increases in the tonnage of nearly every class of manufactures, and it is interesting to note how large the aggregate of the increase in tonnage of commodities is, of which only a comparatively small tonnage of each is handled. Manufactures, designated as "other articles," furnished 1,897,000 tons in 1916, an increase of 756,000 tons. "Miscellaneous" carload commodities totaled 501,000 tons, an increase of 205,000 tons, and miscellaneous l.c.l. freight totaled 1,988,000 tons, an increase of 272,000 tons.

It is likewise interesting to note how large a part of the increase in number of passengers carried was in commutation passengers. The total number of passengers carried in 1916 was 9,154,000, an increase of 1,017,000. The number of commutation passengers carried was 1,564,000, an increase of 457,000, and the number of local passengers carried was 6,516,000, an increase of 414,000.

The Big Four spent \$1,794,000 for additions and betterments to its property other than equipment, issued no new securities, and had on hand at the end of the year \$3,242,000 cash and \$1,337,000 special deposits, with \$1,500,000 loans and bills payable and \$1,130,000 interest matured unpaid. This latter item, of course, does not mean that any interest on the Big Four securities is in default but simply that coupons from bonds or equipment trusts have not been presented for payment.

The 1916 annual report of the Big Four shows ample justification for the resumption of 4 per cent dividends on the preferred stock.

The following table shows the principal figures for operation in the calendar year 1916 as compared with 1915:

	1916	1915
Mileage operated	2,387	2,385
Freight revenue	\$32,536,544	\$26,510,832
Passenger revenue	10,026,742	8,514,689
Total operating revenue	46,678,240	38,364,087
Maintenance of way and structures	4,547,917	4,417,348
Maintenance of equipment	8,686,251	7,487,072
Traffic expenses	1,028,789	876,499
Transportation expenses	15,815,902	13,709,987
General expenses	929,532	849,225
Total operating expenses	31,221,977	27,528,367
Taxes	1,686,720	1,514,131
Operating income	13,763,702	9,314,103
Gross income	15,061,346	10,448,939
Net income	8,331,702	3,404,731
Dividend on preferred stock	374,943	
Other appropriations for 1916	956,795	
Other appropriations for 1915	83,802	
Surplus	6,999,964	3,320,929

NEW BOOKS

Wharves and Piers. By Carleton Greene. 248 pages, illustrated, 6 in. by 9 in. Bound in cloth. Published by the McGraw-Hill Book Company, 239 W. 39th St., New York. Price \$3.

This book fills a definite need for a compilation of modern practice in this special branch of structural engineering. Furthermore, the book adheres distinctly to this field throughout in that it purposely avoids repetition of general information on foundations, timber construction, concrete construction, etc. Instead the author refers the reader to standard works on these allied subjects. On the other hand, the treatment of the subject in question is most complete. Following short chapters on the general principles of construction and economics there is a chapter on timber dock construction. The next one devotes 70 pages to retaining walls for piers and marginal wharves. Other chapters cover the subjects of pier substructures and superstructures, equipment for docks and wharves and mechanical handling of cargoes. An appendix on costs is also included.

Increased Rates May Be Allowed July 1

I. C. C. Authorizes the Carriers to File Blanket Supplements to the Freight Tariffs—Railway Mail Pay

By Our Washington Editor

WASHINGTON, D. C., April 25, 1917.

THE Interstate Commerce Commission on Wednesday issued special permissive orders amending its tariff rules to authorize the railroads to file blanket supplements to existing rate schedules proposing general increases in rates of 15 per cent, except as to a few specified commodities, effective July 1 on not less than 50 days' notice. In connection with these orders the commission gave out the following:

"Following requests by the carriers throughout the country to be permitted to file supplements to existing rate schedules, proposing general increases in rates of 15 per cent, except as to a few specified commodities, the commission has recently heard in conference large numbers of representatives of the carriers and shippers respecting the matter. The purpose of these requests is to avoid the expense and delay incident to the full and detailed preparation and re-publication of all of the existing tariff schedules, substituting in detail the proposed increased rates for those now in effect.

"The commission deems it to be in the public interest that the question of the propriety and reasonableness of these proposed increases should be reached, considered and disposed of as promptly as may be feasible and practicable, consistent with the ends of justice. Therefore, acting under the discretion with which it is vested by section 6 of the Act to Regulate Commerce, the commission has issued the permissive orders announced today authorizing the filing of rate supplements as therein stated.

"In view of erroneous reports that have been published it seems proper to state that the commission has reached no determination, and therefore expresses no views or opinion, upon the question of the reasonableness or propriety of such proposed increases, which, as indicated in the orders referred to, will be subject to protest, suspension, complaint, investigation and correction if in conflict with any provision of the act. Reasonable opportunity will be afforded for the presentation and consideration of protests."

The special permission order provides that, "excepting terminal rates, charges and allowances or absorptions and rates and charges for demurrage, weighing, switching, car service, transfer, diversion, reconsignment, refrigeration, icing, storage, elevation, and other transit or special services, and excepting commodity rates for the transportation in carloads of bituminous coal and coke from producing fields in Pennsylvania, Maryland, West Virginia, Virginia, Kentucky, Tennessee and Ohio to points in Central Freight, Trunk Line and New England Freight Association territories; anthracite coal from producing fields in Trunk Line territory, and iron ore between points in Official Classification territory, carriers be and they are hereby permitted to file special supplements to freight tariffs, upon not less than 50 days' notice to the commission and to the general public, proposing to increase, effective July 1, 1917, rates and charges which are in effect on said July 1, 1917, but not thereafter, provided that where the increase is by a percentage the supplements shall be subject to the rule hereinafter provided for the disposition of fractions and in the form hereinafter set forth."

The order also contains further details as to tariff publication, provides that increased rates may supersede rates which shall have been filed heretofore to become effective on or before July 1, provides that fractions less than one-fourth shall be omitted, between one-fourth and one-half shall be

shown as one-half; three-quarters or greater to be increased to next whole figure. The order also provides a form of special supplement proposed by the carriers on which will be enumerated the tariffs to which it applies and which will include a table of rates giving each rate figure and amount to which it would be increased by the 15 per cent advance, together with rules for the application of increases to the present tariffs. Another order applies especially to rates involved in fourth section orders and allows carriers to file proposed increases for shorter as well as longer distances in spite of the increased discrimination that may result from the percentage advance. Both orders contain statements that the commission does not hereby approve any rates that may be filed under this authority, but they are subject to protest, suspension, complaint, investigation, and correction if in conflict with any provisions of the act. The orders correspond closely to tentative drafts proposed by railroads. Although the carriers had proposed June 1 as the effective date they had expressed a willingness to have a later date set.

Committees of traffic officers of the eastern, southern and western roads held conferences in Washington on Wednesday to consider what action was necessary in view of the commission's order and in order to promulgate the necessary instructions to the various lines for prompt filing of tariff supplements. They also arranged for the filing of additional petitions covering unexpired orders of the commission and rates involved in suspension cases.

SHIPPERS DIVIDED ON RATE INCREASE

All shades of opinion as to the merits of the proposed increase in freight rates were expressed by representatives of shippers at the hearing before the Interstate Commerce Commission on Friday called for the purpose of giving shippers an opportunity to discuss the method of procedure and the character of investigation. A marked difference between the attitude on this occasion and the general opposition to rate increases that has been manifested in previous general rate advance cases was apparent. While many favored the proposed advance and urged that the investigation be conducted as expeditiously as possible, on the ground that it was more important that the carriers should be placed in a condition to give good service than that their rates should be as low as possible, and while many were unalterably opposed to the idea the majority, as well as the most representative of those who spoke, took a middle ground and were willing to accept any conclusion the commission should reach. Opinions as to how much of an investigation would be necessary varied widely, although a majority wanted an opportunity at some time to present their own peculiar conditions which, in the opinion of many, warranted special consideration, and were anxious to preserve existing differentials and relations as nearly as possible.

Clifford Thorne, as a member of a committee representing the National Shippers' Conference, was the principal representative of the radical element, while the more conservative endorsed the statement made by H. C. Barlow, traffic director of the Chicago Association of Commerce, who spoke on behalf of the National Industrial Traffic League, and said he thought the majority of shippers were not disposed to oppose an advance, but were willing to abide by the judgment of the commission. He also urged that the determination of the

question be reached as speedily as the situation warrants.

Chairman Hall announced that the hearing had been called at the request of shippers and others for the purpose of considering questions of procedure and that the commission had reached no decision or conclusion whatever. There was a general disposition on the part of the shippers to discuss the main question rather than methods of procedure, but each was asked by the chairman as to his opinion regarding the proposed orders and little objection was voiced, although there was some objection to the idea of a horizontal percentage advance instead of a uniform advance in cents per 100 pounds.

The first speaker was Benjamin C. Marsh, representing the commission on valuation of railroads, who insisted that the railroads were showing "the most astounding lack of patriotism" in asking for more money at this time and he enumerated a long list of subjects that should be investigated before any advance should be allowed. He insisted that the valuation of the railroads should be ascertained.

W. R. Myers, secretary of the National Shippers' Conference, presented resolutions adopted at the Chicago conference on April 13 and said that Mr. Thorne would make the principal argument for that organization.

A committee representing the Public Utilities Bureau of Philadelphia urged that a thorough investigation should be had before any increase is allowed, but that its nature should be guided by the condition of the country at the present time and should be as brief as possible.

Mr. Thorne said the first question to be determined is as to what the carriers propose and whether sufficient emergency exists to demand an adjudication in advance of a genuine bona fide investigation, by a merely temporary formal investigation by a commission that has already made up its mind. Chairman Hall interrupted him to say that he need not follow that line of thought any further. Mr. Thorne said he was going to add that he had confidence that the commission would not make a merely formal investigation, but that 15 per cent increase in freight rates would amount to more than \$300,000,000 a year and that the proceeding would be the most momentous and important, measured by dollars and cents, ever heard in this country before any court or commission. He said that in former cases the carriers had urged increases to meet emergencies and their claims had proved unfounded afterward. He disposed of the increase in wages required by the Adamson law by referring to the claim of the employees that the increased cost could be avoided by shortening the trains.

Regarding the increase in fuel prices Mr. Thorne said the Chesapeake & Ohio had contracted for coal at \$1.08 to \$1.50 a ton, an increase of only 25 to 50 cents over last year's prices, and that the Louisville & Nashville had contracted for coal at \$1.25 to \$1.75 a ton, as compared with \$1.21 last year. He did not know whether these prices were exceptional. He said there was certainly no emergency in 1916 when the railroads earned \$200,000,000 more net than ever before, and then read figures for the net earnings by months since last July showing the amount by which they exceeded the earnings for the corresponding months of the previous year, although the amounts steadily declined from October, 1916, to February, 1917. He thought from two to four months should be allowed for a complete analysis of railway credit and financial condition and for an analysis of the carriers' exhibits and from 30 to 40 days for analyzing the record and preparing briefs. The commission could then hear shippers as to the effect on their particular business while the analysis is being made. As to the proposed orders, he replied that the filing of the proposed supplements would probably raise all the issues necessary for the determination of the case.

J. V. Norman of the Southern Hardwood Traffic Associa-

tion, said that the interests he represents have already had several advances in rates and should be excepted. He had no objection to the proposed order, but thought the case ought to take the form ordinarily followed in investigation and suspension cases.

Mr. Barlow said that if the carriers foresaw the same conditions in 1917 that existed in 1916 they probably would not be asking for an advance and that the discussion might properly be confined to what has happened since June 30, 1916. The carriers should be permitted to file the simplest and least expensive form of tariffs and he suggested that separate hearings be held simultaneously for the eastern, southern and western districts with a commissioner in charge of each, assisted by an examiner attorney and an accountant. The hearings should be held at Washington in order to be free from local influence. He thought the majority of shippers were not in the position of opposing an advance, but that public notice should be served that any advance is to meet a temporary emergency and the commission should keep control of the situation. He thought the proposed orders would be satisfactory to the shippers, opposed any change in the differential between rail and lake and rail rates and urged that any advances should be made on the rates between basing points in such a way as to maintain existing arbitraries and differentials.

W. E. Lamb, representing the California Fruit Growers' Exchange, said that an advance of 15 per cent would cost the citrus fruit shippers \$3,300,000 a year, which could not be passed on to the consumer. He opposed the idea of an increase being applied to the rates now subject to complaint and objected to a horizontal percentage advance on the ground that it would increase the higher rates more than the lower rates.

J. S. Brown, representing the Chicago Board of Trade, endorsed Mr. Barlow's statement, but thought the advance should not become effective until the railroads have had an opportunity to adjust the relationship of rates.

W. H. Chandler, representing the Boston Chamber of Commerce and the New England Industrial Traffic Conference, said that some advance should be allowed if the claims of the carriers are correct, but thought that passenger fares should stand a proportionate increase.

J. C. Lincoln, representing the Merchants' Association of New York, said his association felt there should be an immediate and substantial advance in rates, that it was more important that the railroads be in a position to give adequate service than that rates should be kept down, but that the commission should retain control of the situation. He thought a percentage advance was probably necessary, but suggested the possibility of allowing a smaller percentage of increase on long haul traffic.

C. B. Heinemann, of the National Live Stock Exchange, thought that live stock rates should be considered independently and that the commission should give a thorough investigation of at least four months.

J. S. Burchmore, representing Illinois cement shippers, thought that the investigation should be handled expeditiously, but that a reasonable opportunity should be allowed for brief arguments as to the existence of an emergency and as to special conditions, with the idea that the commission might find it proper to suspend advances on some rates. Commissioner Clements remarked that if anything were done it would probably have to be done in some wholesale manner without considering every special situation.

J. H. Beek, representing the St. Paul Association of Commerce, said that a greater tax would be imposed upon the public if the railroads were unable to give adequate service than the advance in the rates would amount to, but the commission is better qualified to judge whether rates should be advanced than any shipper and that if they are entitled to

it they are entitled to it now. In reply to the speaker who had charged the railroads with lack of patriotism, he pointed to the fact that they had voluntarily turned over the railroad system of the United States to the United States government under the direction of a committee of five.

W. B. Allen, representing the West Coast Lumber Manufacturers' Association, objected to the advance on the ground that it would subject the lumber interests to an advance of from \$1,500,000 to \$2,000,000 on lumber already sold which they have been unable to ship and that a 15 per cent. advance would place them at a great disadvantage in competition with lumber that moves a shorter distance and takes lower rates. He suggested that hearings should be had on the Pacific Coast. Francis B. James, representing the National Association of Paving Brick Manufacturers, objected to a horizontal advance and asked that brick be treated separately so that there might be no disturbance of rate relations. He also said there was a large amount of brick under contract which could not be shipped because of the scarcity of cars and would now be subject to the advance.

R. S. French, of the National League of Commission Merchants, endorsed Mr. Barlow's statement, but thought that any increase should be for one year only.

A representative of the National Grange delivered an eloquent tirade against the railroads, saying that no advance in rates should be allowed until the valuation is completed and charging the railroads with giving away their revenues to the Pullman Company and to the express companies. He said the railroads were asking the advance only on probabilities which should be fully investigated.

H. G. Wilson, of the Toledo Chamber of Commerce, thought the proposed order is entirely within the power of the commission, but suggested that the commission should not use any definite percentage in the order. He said the law requires a full and complete investigation, but that the rates should be put into effect as soon as possible pending the completion of the investigation.

Frank Lyon said the problem was one for Congress rather than for the Interstate Commerce Commission, that it would be a great injustice to increase interstate rates 15 per cent if the state commissions prevented an increase of state rates and that probably half of the increase will go to railroads that do not need it. In this great war emergency, he said, it would be better for the country if the railroads were required to keep an account of their increased expenses and Congress were then to appropriate the necessary amount of money for the roads that need it.

A. M. Fisher, representing the Washington Chamber of Commerce, argued against the idea of a horizontal percentage advance, saying it would afford but temporary relief and eventually reduce the revenue of the carriers by reducing the amount of long haul business and giving an advantage to the short haul business, which is the least profitable part of the carriers' traffic, and would tend to increase congestion. He suggested an advance of a specific amount on each rate and saying that an increase of one cent per 100 pounds would give the roads \$200,000,000 a year.

G. M. Freer, representing the Ohio Shippers' Association, endorsed Mr. Barlow's statement, but thought the commission might undertake an investigation without any tariffs before it. He thought that all tariffs now involved in investigation and suspension proceedings should be withdrawn, and was told that the railroads had already proposed that this be done.

W. P. Trickett, of the Minneapolis Traffic Association, said the carriers should be given any increase the commission finds justifiable, but that the commission should enter upon a thorough investigation.

C. B. Stafford, of the Louisville Board of Trade, said he would not be opposed to any increase after a finding by the commission that it is necessary, but that there should be

thorough investigation. Chairman Hall asked if he meant by that one running ten months or so. Mr. Stafford thought three or four months would be sufficient.

H. J. Sheridan, of the Baltimore Chamber of Commerce, said he thought the railroads needed more revenue, that his shippers were in favor of an advance in rates and were satisfied to leave the methods to the decision of the commission.

SENATORS WANT INVESTIGATION OF RATE INCREASE

The proposed increase in freight rates was debated for nearly an hour in the Senate on Saturday morning in connection with a resolution introduced by Senator Hoke Smith of Georgia, directing the Senate Committee on Interstate Commerce to investigate the facts and report them with recommendations to the Senate. The resolution stated that the railroads have asked for a flat increase of 15 per cent of all freight charges, amounting to \$400,000,000 annually, in spite of increases during the past three years, "amounting to 5 per cent for the central railroads, between 5 and 10 per cent for the western railroads and between 15 and 20 per cent for the southeastern railroads." It was also stated that the gross freight revenues for the last six months of 1916 amounted to practically $3\frac{1}{2}$ per cent on the book value of the roads. The upshot of the discussion was that the resolution was referred to the committee without action, with the addition of an amendment offered by Senator Smith requesting the committee to report "a measure preventing the increase of freight rates until after full hearing the increases are found by the Interstate Commerce Commission to be just and reasonable."

Most of the senators who took part in the debate had not heard of the notice sent out by the commission that if the railroads are allowed to file tariffs, hearings will be had on the question of suspending them, and some of the senators seemed to be worried for fear the commission would allow a 15 per cent advance without hearings. The misunderstanding was doubtless created in part by newspaper stories sent out on Friday to the effect that the commission had "tentatively granted" an increase, whereas the commission had merely given out a copy of the tentative draft of an order proposed by the railroads for an amendment of the commission's tariff rules to permit them to file supplements to the existing tariffs.

Senator Smith calculated his \$400,000,000 increase by taking 15 per cent of the gross freight revenue of the railroads for the last six months of 1916 and multiplying it by two. Senator Harding and others pointed out that the Interstate Commerce Commission has authority to suspend the rates and felt that it would be discrediting the commission if Congress should attempt to give it instructions in the matter. Senator Harding said that if the Senate desired the information it could call on the commission for it without making an investigation of its own. Senator Fletcher and Senator Jones said that they had called on the commission in response to telegrams received from home and had been assured that no action would be taken until the shippers had had an opportunity to be heard and that a preliminary hearing had been held the day before.

Senator Pomerene moved that the resolution be referred to the committee, urging that it ought to give the matter consideration before undertaking a third investigation in addition to that which will be held by the Interstate Commerce Commission and that being held by the Newlands committee as to possible changes in the interstate commerce law. Others expressed the opinion that members of the Interstate Commerce Committee would not have time to give the matter proper consideration before the Interstate Commerce Commission has acted on it. In finally consenting to send the entire resolution to the committee with the suggested modification, Senator Smith said that in the meantime

He would see if he could not draft a bill to prevent any increases going into effect without a full hearing.

On Monday Senator Smith introduced another resolution requesting the Interstate Commerce Commission to suspend the increases "until they have been thoroughly examined in detail by the commission to determine whether they are just and reasonable or until such time as Congress may investigate the same to determine whether legislative action is advisable." In the second resolution Mr. Smith said that "with the increase of local rates to follow" the 15 per cent advance will be over half a billion of dollars annually. In his first resolution he had calculated it as \$400,000,000 by taking 15 per cent of the gross freight receipts, which, of course, includes the revenue from local rates. The resolution went over for a day under the rules.

RAILWAY MAIL PAY

The Interstate Commerce Commission will hardly be able to begin before next fall its consideration of the questions of reasonable rates for the transportation of mail and the comparative merits of the weight and the space methods of computing railway mail pay. These questions were put up to the commission for determination by the post-office appropriation law passed by the last Congress. On November 1 the postmaster general put most of the railway mail routes of the country on the space basis of payment and on March 27 a weighing of the mails was begun for statistical purposes, in order that the commission may be able to make some comparisons of the effect of the tentative rates prescribed by the law to be applied on the space basis and the former rates based on weight. This weighing is to continue for 35 days and it is expected that it will then take about four months to compile the data for presentation to the commission. It will not be possible to compare the effect of the new rates exactly with the results obtained on the old basis because the post office department has made numerous changes in the service required of the roads.

Some time after the space basis had been put into effect the post office department gave out a statement that the railroads on the basis of the service on November 1 were being paid at the rate of \$3,000,000 a year more than on the former rates based on weight, but the service has been so rearranged since then that the payments to the roads will be materially reduced. Formerly the roads were paid according to the weight ascertained every four years. Now they are paid so much a car mile and the more mail the department can put into the cars the less car miles it has to pay for. Therefore, it has been gradually consolidating the mails formerly handled on two or more trains into one train, reducing the frequency of service, but increasing the load per car.

As mail clerks and the work of sorting mail on the trains requires much more space than the mail alone would require, some of the working of the mail en route has been eliminated and is done at the post office after its arrival. This explains why certain mails are not delivered so promptly nowadays as formerly, but it makes for a showing of economy in the post office department and frequency or promptness of service do not show in the reports. There are indications, however, that some of the effects are being noticed by people who have been in the habit of receiving mail regularly from certain places. Of course, the plan of consolidating mail heretofore carried in two cars into one car has some effect in reducing the expense to the railroads, but not enough to offset the reduction in revenue.

THE RAILWAYS' PART IN THE IRISH REBELLION.—At the Great Southern & Western of Ireland annual meeting the chairman said that at the time of the rebellion last Easter, the company was able to give great assistance to the authorities by turning out five armored cars, which saved much life to the soldiers.

TELEGRAPH SUPERINTENDENTS' MEETING

The subject of overhead wire crossings with railway tracks was the most important one discussed at the meeting of the western division of the Association of Railway Telegraph Superintendents held in the Hotel La Salle, Chicago, on April 19. The presentation and discussion of this subject occupied practically all of the morning and part of the afternoon session. H. B. Teed, superintendent of telegraph, St. Louis-San Francisco, Springfield, Mo., chairman of the western division, called the meeting to order and introduced W. J. Canada, electrical engineer, Bureau of Standards, who presented the Bureau's circular No. 54 on the National Electrical Safety Code for discussion.

Mr. Canada pointed out that the specifications for the crossing of telegraph and telephone lines over railways are similar to the specifications adopted by this association, with the exception that a distinction is made between important and unimportant railways, allowing somewhat smaller poles and lighter guys for crossings over railways of light traffic. He also called attention to the desirability of influencing the State commissions wherever possible to adopt the new national code rather than to prepare special codes of their own which would of necessity introduce conflicts and inconsistencies. The recently promulgated rules of the Illinois commission are typical of the special rules which commissions are likely to prepare. These Illinois rules are thought to be deficient in a number of details which are quite important to the railways.

In opening the discussion on this subject, E. C. Keenan (N. Y. C.), recalled the fact that 20 years ago practically the only feature of wire crossings which was given consideration was the clearance, and it was a difficult matter to get the increases in vertical clearance from 21 ft. to 23 ft., and later to the 25 ft. now generally used. At that time little attention was paid to the strength of the crossing. The Association of Railway Telegraph Superintendents saw the need for improvement, and through a committee framed specifications for telephone and telegraph wire crossings which are thought to be the best in existence on that subject. Recent experience has indicated, however, that even these specifications are not as rigid in some respects as they should be. Pole lines continue to blow down every year in sleet storms because they are not designed for the maximum possible loading with an ample factor of safety. He urged that they be designed on the same basis as power lines, having an assumed loading of a 1/2-in. coating of ice on the wires, and an 8-lb. wind pressure. On the whole, Mr. Keenan advocated the active support of the new code by the Association with certain modifications in the required strength of pole line.

The question was raised by M. H. Clapp (No. Pac.) as to the distinction in the code between important and unimportant railways in determining the degree of safeguarding required for wire crossings. Some of the members felt that the number of trains passing is a more accurate indication of the safety requirements needed than the number of telephone or telegraph wires paralleling the track, which is the basis of distinction used in the code. A siding or a branch line may involve more hazard to trainmen than a main line because there is more likelihood of trainmen riding on cars during switching movements than in through service.

Mr. Clapp also raised the question as to the length and arrangement of the new code, comparing its complications and volume with the simplicity and brevity of the new Illinois rules. In reply to this question Mr. Canada pointed out that in the opinion of the Bureau the Illinois rules leave many loopholes on account of the attempted brevity, and suggested that if State commissions do not feel justified in adopting the new code in full it would be much better to follow the plan of the Wisconsin commission, viz., to issue

an abstract of the code rules with the specific statement that for details not covered in the abstract, the National Electrical code should be followed.

G. A. Cellar (P. L. W.) called attention to the fact that the code under discussion is in the form of general rules, and not detailed specifications which must be prepared before the railways can make use of the standards. He suggested that the Association might undertake the preparation of these rules in specification form.

Mr. Clapp, chairman of Committee I on construction and maintenance of outside plant, reported that his committee expects to have ready for the annual meeting a complete discussion of the new code with constructive criticisms. He further reported that work is under way on a specification for railway pole lines, and in that connection he suggested that it would be well to consider a new method of making concrete poles which had been called to his attention. Upon invitation of the chairman a paper on this subject was read by Walter H. Lienesch, consulting engineer, Universal Concrete Products Company, Chicago.

CONCRETE POLES

A simple machine has recently been perfected which employs the principle of centrifugal force to produce a round, hollow concrete pole possessing desirable qualities. The operation of the centrifugal process is described as follows:

The lower half of a circular metal form is placed on rollers set in line with the special machine, which is constructed so as to revolve the form in a horizontal position. This half form is filled with wet concrete material, a fabricated cage of reinforcing steel is laid into the concrete, the upper half of the form is placed in position and the entire form, concrete and steel, is rolled into the machine. Special clamps in the machine hold the halves of the form together. After the form is securely clamped in place it is revolved for a period of several minutes at a high rate of speed. During this action the centrifugal force which is developed causes the concrete to be compressed against the inside of the form with a pressure varying from 75 to 300 lb. per sq. in. producing a dense concrete structure having a smooth hole through the center and walls tapering in thickness from end to end.

During the mechanical action of this process, all air bubbles and other voids are eliminated from the plastic mass of concrete, owing to the difference in specific gravity between water and the aggregate, the water is caused to flow toward the center and it is finally expelled from the pole by pouring out of the large end. The immediate elimination of a great percentage of moisture, causes the plastic material to set up into a firm body which bears considerable rough handling before the initial set has occurred in the cement.

Immediately after the pole is turned, it is removed, in the form, from the machine and allowed to set for a period of 12 hours, after which the upper half of the form is removed and the finished pole is rolled out of the lower half into a bed of fine sand. The pole is then allowed to harden for 96 hours, at which time it is removed to a storage yard and is ready for shipment after being cured under water for a period of 10 days.

The forms and steel cages of reinforcement used in connection with the centrifugal process are so constructed that the steel is retained in the center of the concrete protection along the entire pole length. The steel cages are woven in a special loom which spaces the longitudinal bars accurately about the perimeter of the cage and winds them with an exterior spiral of steel wire having a varying pitch which is closest at the base of the cage. The use of numerous small units of steel, some of which are stopped off at various points along the length of the pole, permits the graduation of sectional area from a minimum at the top to a maximum at the ground line. The combined action of the exterior spirals together with the varying thickness of the concrete inside of the cages,

prevents the bars from buckling in any direction so that the full compression value of the steel is developed along the entire length of the bars, giving the pole a varying strength, which is greatest at the ground line. The weight of a properly designed centrifugal pole is 50 per cent less than that of any solid concrete pole of equal strength, and only $2\frac{1}{2}$ times that of the best cedar poles, which have only one-half the strength of the concrete pole.

The design of centrifugal poles has been made with reference to three classes of loading. Assuming wire spans of 100 ft. with 20 per cent of the total pole length in the ground, Class A will withstand a horizontal pull of 4,500 lb. applied at a point 5 ft. from the top; Class B, 2,650 lb. 3 ft. from the top; and Class C, 1,500 lb. $1\frac{1}{2}$ ft. from the top. A standard taper equal to one-quarter inch per foot of pole length has been adopted. The top diameters are $5\frac{3}{4}$ in. for Class C; 7 in. for Class B, and $8\frac{1}{2}$ in. for Class A. The diameter of the butts, of course, varies with the pole length.

Although the round hollow pole is the lightest concrete pole that can be produced for a given strength, the transportation of such poles is a serious problem from a cost standpoint and in order to offset this objection, plans have been made to establish plants at advantageous points so that this product can be delivered anywhere in the country at a reasonable cost. In answer to questions after the paper was read Mr. Lienesch stated that a 35-ft. pole has been bent 31 in. from the vertical before it took a permanent set. As to price, he estimated under normal conditions, that the concrete pole will be 25 per cent higher than an untreated cedar pole in the Chicago district.

HIGH RESISTANCE TELEPHONES.

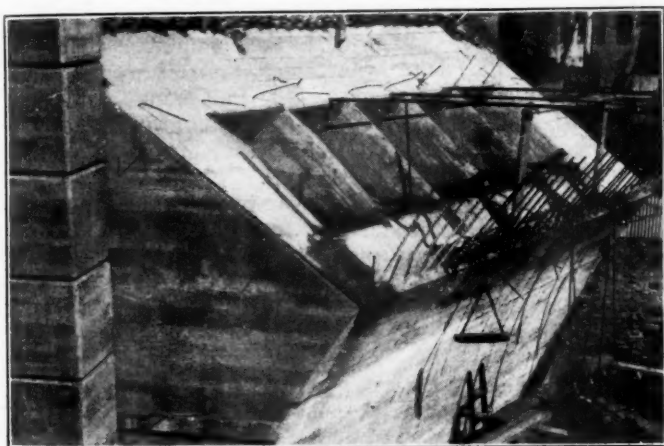
Progress reports were called for from the chairmen of the other standing committees, which were very briefly discussed. Mr. Keenan in presenting the report of his committee on telephone and telegraph developments referred particularly to the recent trial on the Cleveland, Cincinnati, Chicago & St. Louis of high resistance receivers on telephone despatching circuits to improve the transmission. This development grew out of the unusual conditions existing during recent months under the very heavy movement of traffic. On one 100-mile division on one day there was a freight train on every siding at the same time and every operator was naturally listening in on the despatcher's line in an attempt to keep the trains moving. This of course resulted in weakening the transmission so that the despatcher was very much hindered, and complaint was made. Tests showed that with the way stations cut out, the transmission was normal, and the idea was therefore conceived of using a high voltage receiver at these stations to minimize the effect of leaving the receiver off the hook. Standard receivers used in wireless telephony were secured, these being of the double type, with 1500 ohms in each receiver, making 3000 ohms across the line. The installation of these receivers in the 30 stations on this 100-mile circuit improved the transmission so much that it could be classed as good from end to end. Some laboratory tests were then undertaken with these receivers, and it was found that one 1500-ohm receiver, with a choke coil in series, gave equally good results, and the remaining receivers were, therefore, taken off and used on other circuits. It was also found that, contrary to expectations, circuits equipped with these high resistance receivers were no more noisy than with lower resistance.

Following a discussion and vote of information, the executive committee decided to change the date of the annual meeting from September 18, 19 and 20 to September 11, 12 and 13 in order to avoid a conflict with the Railway Signal Association convention. It was announced that the Hotel Willard, Washington, can be secured for that date. Secretary Connelly announced that the total registration at the meeting was 68.

New Bridge Over the Schuylkill At Manayunk

The Pennsylvania Railroad Is Building an Arch Structure Involving Interesting Construction Methods

THE Pennsylvania is now constructing an arch bridge over the Schuylkill River at Manayunk, Pa., to replace an old, double track, steel structure. The building of this bridge, which involves an expenditure of approximately \$700,000, is a part of general improvements to the Schuylkill division that are being made to care for increasing traffic and to permit the operation of heavier equipment over the line. The alignment across the present bridge includes 7 deg. 50 min. curves at each end, and advantage has been taken of this condition to erect the new structure without interference with the old, while at the same time improving



Keys in the Shew-back

the alignment by reducing the curvature on the new bridge to 6 deg. with eight-centered spirals.

THE NEW BRIDGE

Commencing at the east, the new bridge consists of five deck-girder spans placed on a 1.3 per cent descending grade westbound, two 90-ft., one 120-ft., three 150-ft., one 120-ft., and two 105-ft. arch spans and two half-through girder spans placed on an 0.8 per cent descending grade westbound. Commencing again at the east end, the first span is on a spiral, the next six on a 6-deg. curve, the eighth on a spiral, the

Graded gravel and river sand were used in the concrete, 3,000 cu. yd. of which was placed in the foundations and 45,000 cu. yd. in the neatwork. More than 1,200,000 lb. of reinforcing steel was placed in the structure. The excavation at the river piers was made by means of timber coffer dams that were floated to place, sunk to rock and puddled with clay. The dams were then drained by two centrifugal pumps, and the foundations seated in the rock.

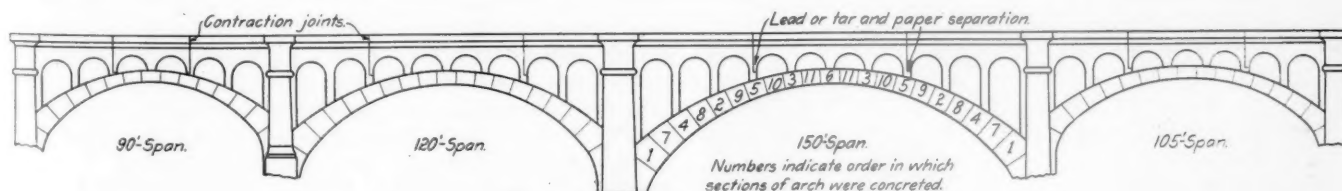
Because the piers are on an angle of 65 deg. with the center line of the bridge, all construction joints in the arches were keyed by placing wedge-shaped boxes in the skew-backs, 6 ft. by 4 ft. long and 6 ft. by 2 ft. deep at one end and coming to an edge at the other so as to provide faces normal to the line of thrust. Where there was not room to place the boxes, the same effect was obtained by staggering the construction joints across the face of the arch, making six saw-tooth keys. The finished joints and the construction methods are shown in the accompanying photographs.

CONSTRUCTION METHODS

A cableway with a carrying capacity of eight tons, spanning between towers, located diagonally across the bridge because of the curvature is the main feature of the construction plan. The concrete mixing plant was located at the east end of the bridge, adjacent to the construction track where gravity bins are provided. The materials are brought in by trains, dumped into these bins and pass by gravity to the two mixers, which have a capacity of 22 cu. ft. each. From the mixers the concrete is dumped into buckets having a capacity of 66 cu. ft., or three batches from the mixers.

The buckets are mounted on trucks and a narrow-gage track is provided for transporting them from the concrete chute to the cableway and return. The loaded buckets drop down to the cableway by gravity, and a stationary engine and cable are provided to bring the empty buckets back to the chute. The loaded buckets are picked up by the main cableway, transferred to the desired location and dumped into a portable carrier provided with spouts. The concrete is poured from the carrier to the forms and the spouting rarely exceeds 30 feet.

The centering of the 120-ft. and the 150-ft. arch spans



Part Elevation of the Bridge

ninth, tenth and eleventh on a 463-ft. tangent between the two curves and the remaining four spans on the spiral and the 6-deg. curve at the west end of the bridge. The combined length of the spans exceed 1,800 ft., and the bridge provides for double track.

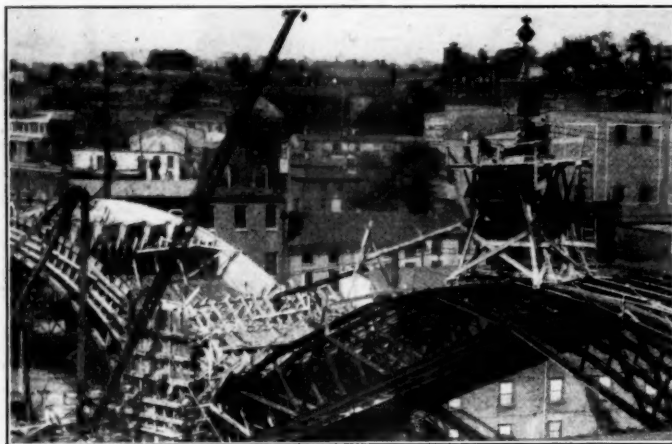
The structure was designed in accordance with mass rather than reinforced concrete practice, although reinforcement was used in the arch rings, spandrel walls and parapets. The abutments and all of the piers are founded on Conshohocken granite, encountered about 90 ft. below the base of rail, and in which the footings are imbedded to a depth of two feet.

consisted of steel ribs supported by posts of four 12-in. by 12-in. timbers placed on the pier foundations and capped with 12-in. by 12-in. sills. The ribs were placed parallel to the center line of the bridge or at an angle of 65 deg. with the face of the piers, and the thrust is transferred to the piers by concrete blocks built for this purpose and poured at the same time as the piers. The blocks are cut off after serving their purpose.

On land, the centering was placed by the cableway and stiff-leg derrick and over water by the cableway in conjunction with derricks mounted on scows. Four-inch lag-

ging was used for the 120-ft. and 150-ft. arches and 3-in. for the 90-ft. and 105-ft. arches.

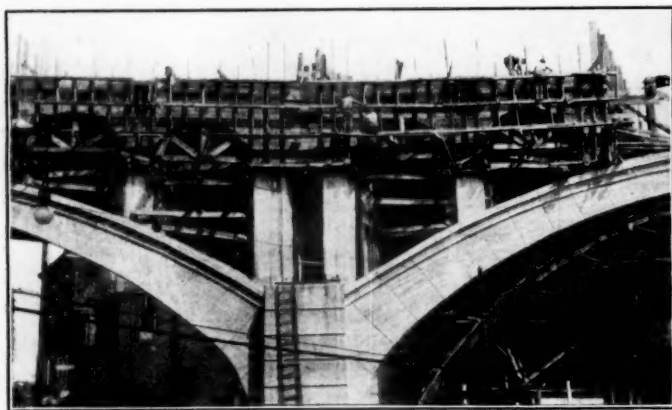
The transverse walls supporting the spandrel arches were built up to the springing line in one operation, except for the 150-ft. spans, where they were built in two lifts. The forms for the deck were then placed according to the order in which they were to be poured. The spandrel arch forms were built up in two parts, separated at the center, sufficient centering being provided for ten complete arches. The forms were swung to place by the cableway and stiff-leg derrick, and were supported on uprights resting on the back of the main arch. The forms were held in place by wedges placed



The Derrick, Portable Carrier, Cableway and Concrete Bucket

between the sills that capped the uprights and a box built to conform to the circle of the arch as a part of the form. The forms were removed by knocking out the wedges. Above the quarter points of the arches, $\frac{1}{2}$ -in. joints of hair felt were provided in the deck sections for separation. They were covered over with a fiber compound and flashed with copper. The drainage for the spans over Green Lane, Main Street and the canal is carried to the pilasters, where a sewer connection is provided.

The arch rings were placed in sections as indicated in the accompanying diagram. The sections bearing the same



View Showing the Deck Forms

number were poured simultaneously if possible, and always before the section bearing the next greatest number. The forms for section No. 1 required no bracing, being wired down to the lower reinforcing rods. The side forms of section No. 2 were braced to the back form of the main arch and the top forms were wired to the lower reinforcing rods. The forms of the other sections were placed in the same manner except for section No. 4, in which the blocks were

supported by 4-in. by 4-in. timbers braced to section No. 1, the timber being removed as the No. 7 sections were poured.

When building the spandrel walls, arches and deck, the portions of the spandrel structure between the piers and the contraction joints were concreted before placing the concrete for the spandrel in the middle of the spans. This method was followed to avoid excessive eccentricity of loading during construction.

The construction of the bridge is being carried on under the general direction of A. C. Shand, chief engineer of the Pennsylvania. D. P. Pugh, assistant engineer, is in direct charge of the work.

RAILROADS TACKLE THE FOOD PROBLEM

The railroads in the United States have caught the garden fever. Judging by appearances, if the patrons and farmers along their lines get only half as enthusiastic about farming as the carriers are, America's threatened food problem will fade away into insignificance.

Many roads have announced to their employees that they can use unoccupied land belonging to the railway for cultivating food crops this summer. The Baltimore & Ohio has established a farm labor bureau and employment agency. The Lehigh Valley will make a special appeal to women and will send out a "Save the Surplus Special" car or train. The Lackawanna has offered to farm bureaus along its lines 25 per cent of its section laborers for two weeks in planting season. It will similarly place these forces at the farmers' disposal in the harvest season and will furnish free transportation to workers. The Nashville, Chattanooga & St. Louis has turned over its 12 demonstration farms, comprising 1,763 acres, for immediate use and will discontinue the usual experimentation until the crisis is over. The New York Central, working with New York Mayor's Food Supply Committee, will help supply labor and seeds. Farmers along its lines will be assisted financially through the station agents and the Patriotic Farmers' Fund.

NEW YORK CENTRAL

President A. H. Smith has issued announcements to the effect that through the Mayor's (New York) Food Supply Committee there has been made available 40,000 bushels of A1 Aroostook county potatoes, which will be sold at the cost price of \$2.55, plus freight. Such potatoes are selling in the open market for \$3.50 to \$4 a bushel.

The primary purpose of the railroad is to secure New York City's food supply, and each farmer who is furnished with potatoes by the New York Central will be required to give the Mayor's Committee a ten-day option on his potatoes at the prevailing market price. Mr. Smith estimated this would guarantee to the city 500,000 bushels, or 30,000,000 pounds of potatoes. Mr. Smith's statement further says:

"Farmers' notes without security will be accepted in payment for the seed potatoes through an arrangement with the local banks and the Patriotic Farmers' Fund, the purchaser needing only the approval of a local loan committee of three members. An interest rate of only $4\frac{1}{2}$ per cent will be charged. As much as \$10,000,000 will be available for such agricultural purposes.

"The biggest feature of the New York Central's undertaking is that of supplying labor to farmers, and a special bureau has systematized this work and undertaken a canvass aimed to mobilize the man-power available at its highest efficiency. Free transportation will be afforded to all workers who enlist in the 'soil-tilling army' to the particular points where they are most needed."

RAILWAYS ENTERING NEW YORK CITY

The Food Problem Committee of the Merchants' Association last Tuesday held a conference of railway officers with

a view of securing co-operation in the work of guaranteeing an ample food supply for the city. The meeting was attended by W. H. Truesdale, president of the Lackawanna; Ralph Peters, president of the Long Island; Clifford S. Sims, general manager of the Delaware & Hudson; G. E. Orcutt, vice-president of the Erie; S. L. Sheppard, vice-president of the Pennsylvania; T. E. Crowley, vice president of the New York Central; J. B. Stewart, general manager of the New York, Ontario & Western; James MacDonough, general manager of the Central of New Jersey; Benjamin Campbell, vice-president of the New Haven, and Arthur Iselin representing the Buffalo, Rochester & Pittsburgh. Representatives of the state and municipal employment bureaus were present.

After the meeting the following railroad committee was named to act with the Food Problem Committee of the Merchants' Association in the work of helping the farmers get seed, fertilizer, labor and transportation: George Bates, industrial agent of the Delaware & Hudson; C. A. Call, manager of industrial bureau of the New Haven; Donald Wilson, general freight agent of the Long Island; G. A. Cullen, passenger traffic manager of the Lackawanna; F. S. Welsh, agriculturist of the New York Central; P. H. Burnett, industrial commissioner of the Lehigh Valley, and R. W. Quackenbush, industrial agent of the New York, Ontario & Western. The Merchants' Association has also announced that it will make a census through employers in New York, New Jersey and Connecticut of employees in manufacturing establishments who have had farming experience and who are willing to work for brief periods on farms this summer.

BALTIMORE AND OHIO

The Baltimore & Ohio has organized a farm-labor employment bureau, and through its officers and representatives in the principal industrial and agricultural districts it will endeavor to provide a clearing-house for suitable farm hands to insure larger crops. Efforts will be made to prevail upon those who, for various reasons, cannot enlist for military service, as well as those who are seeking employment, to accept situations on farms.

The commercial development department of the Baltimore & Ohio is also busy making a study of agricultural conditions, compiling data and giving information to all who ask for it. Complete lists have already been made of grain elevators, canning factories, cold storage, and other storage warehouses, giving their full capacity and amount of available foodstuffs on hand. Farmers and truck gardeners, together with their available acreage and number of acres planted, and the kind of product raised, are being listed by districts.

The freight and passenger departments of the company have also been enlisted in the work of gathering information and advising on farm conditions. Mayors of cities, agricultural colleges, commercial bodies, boards of trade, schools, and chambers of commerce have been asked to co-operate in the collection of this information.

LEHIGH VALLEY

The Lehigh Valley will make a special appeal to women to do their part in insuring a maximum crop for this year. While women cannot do the heavy work on the farm, they can aid to a large extent by eliminating the waste. For the purpose of demonstrating how this can be done, the Lehigh Valley will send a "Save the Surplus Special" along its line.

A car will be equipped with a complete canning outfit and every facility for showing just how fruits and vegetables, which might otherwise go to waste, may be utilized to help the nation's food supply. Miss Martha Van Rensselaer and Miss Flora Rose, in charge of the home economics of the New York State College of Agriculture at Cornell University, have been enlisted for this work, and the United States

Department of Agriculture has loaned several important exhibits.

An itinerary will be worked out carefully so that the demonstration may be taken to every point on the Lehigh Valley where good can be accomplished.

CHICAGO, MILWAUKEE & ST. PAUL

President A. J. Earling, of the Chicago, Milwaukee & St. Paul, called a meeting of the officers of the company and asked for suggestions for handling the situation. At this meeting it was decided to offer all of the company's unused lands to the public for farming purposes. In order to avoid a surplus in one commodity and a shortage in another, the railroad's agricultural bureau was instructed to get in touch with the Department of Agriculture at Washington and with similar departments of the State universities so as to be in a position to give advice on the kinds of crops to plant in each section.

It was also decided to have the company's agents communicate with the farmers to ascertain what they need in the way of additional help, seed, and supplies in general. A general information bureau will be established at Chicago. Orders have been issued to superintendents that agricultural implements and supplies have the right of way and shall be sent through by fast express if necessary.

Arrangements have also been started to obtain a supply of seed and make every effort to induce the 65,000 employees of the company to start vegetable gardens and raise vegetables for their own consumption.

SOUTHERN

Fairfax Harrison, president of the Southern, has issued a statement urging upon southern farmers the importance of producing the foods and feed stuffs needed for the people and animals on their farms and a surplus for sale, pointing out that vast quantities of foods and forage will be required for our own army and navy and for our allies in Europe. He said that while it is the patriotic duty of every southern farmer to do so, he will also find it profitable, and it should be impossible to find a farm anywhere in the South without a home garden. Mr. Harrison said that the newspapers could perform a patriotic duty of the highest value by impressing upon their readers the supreme importance of overlooking no opportunity to increase the production of foods and feed stuffs in the South.

NASHVILLE, CHATTANOOGA & ST. LOUIS

The Nashville, Chattanooga & St. Louis has turned over its 12 demonstration farms, representing 1,763 acres, to the cultivation of food crops. All plans made by the company for experiments in soil fertility, crop rotation, etc., will be abandoned until the close of the war.

DELAWARE, LACKAWANNA & WESTERN

G. A. Cullen, passenger traffic manager, sent this telegram on April 21 to Governor Whitman of New York:

"In the last three days the cities of Binghamton, Elmira, Cortland and Norwich have organized to provide farm labor for their respective counties, industrial employers giving their men from one to three weeks' vacation and guaranteeing them any difference between what they receive on the farms and their regular wages, all men so enrolled being handled through the farm bureau manager of the county, who, on the other hand, takes a continuing census of the needs of the farmers, thus thoroughly co-ordinating the labor supply with the demand by requisitioning the enrolled men as called for from week to week by the farmers.

"The men themselves, all of whom must have had previous agricultural experience, are responding in great numbers to this call, and it is now evident that by this means the counties of Broome, Chemung, Cortland and Chenango, and probably also Tioga, will receive all farm help needed to

produce crops on considerably increased acreage over normal.

"I bring this to your attention owing to the urgent and immediate need of a workable plan for the solution of the farm labor problem. This plan has received the universal indorsement of the employers of labor and the farmers themselves in the counties mentioned, and is today in actual operation. From what I know of other parts of the state I am satisfied that this plan can be applied generally throughout the state where there are farm bureau managers to act as clearing houses as above. President Truesdale of this company has placed at the disposal of these farm bureaus 25 per cent of its section hands for two weeks in the planting season and again in the harvesting season, and is willing to furnish free transportation for workers on the farms serving under this agreement."

LOS ANGELES & SALT LAKE

The National Preparedness Train will leave Salt Lake City May 2 and will travel over the Salt Lake Route through Utah, Nevada and California. The train will be patterned after the train hitherto known as the Utah demonstration train. It will consist this year of at least 15 cars of educational exhibits and many types of modern farm machinery. The demonstration will include practically every phase of farming and extensive educational work will be taken up regarding methods of producing and marketing. A corps of experts consisting of 20 or more persons, all selected to cover the present conditions of emergency, will accompany the train. The operations of the train will be directed by a committee of two leading professors each from the University of California, Utah Agricultural College and the University of Nevada.

CHICAGO, BURLINGTON & QUINCY.

The Chicago, Burlington & Quincy offers its right of way over the entire system for the cultivation of gardens. Any one living near the line may procure tracts for cultivation purposes, although employees of the road are to be given preference. Tracts may be obtained by application to the nearest station agent or section foreman. Assistance and advice regarding the growing of gardens on these tracts is being furnished gratis by J. B. Lamson, agriculturist, Chicago, and O. H. Liebers, agricultural agent, Denver, Colo. The road has also designed a poster, headed "Increase your Production of All Food Products," copies of which are being sent to all stations and banks within the territory of the line.

Among the many roads that have told their employees that they can cultivate unused railway property are the Pennsylvania, the Central of Georgia, the Chicago, Milwaukee & St. Paul, the Erie, and the Lehigh & New England.

LEGISLATION AFFECTING RAILWAYS

It has been practically determined that no general legislation will be enacted at the present extra session of Congress. Democrats of the House of Representatives in caucus on April 19 agreed to consider only such war and general defense legislation as may be recommended by the President and the Senate Republicans have taken similar action. Numerous bills affecting railways nevertheless continue to be introduced.

The Senate has passed a bill, S. 383, introduced by Senator Culberson, to punish the destruction or injuring of war material and war transportation facilities by fire, explosives or other violent means and to prohibit the hostile use of such property during the time of war. The bill was sent to the House and after being referred to the Committee on the Judiciary was reported back to the House without amendment and placed on the calendar.

On April 17 the Senate Committee on Interstate Commerce reported without amendment the bill S. 1816 by Senator Robinson to increase the membership of the Inter-

state Commerce Commission from 7 to 9 and to allow it to organize itself into divisions. Representative Adamson has introduced a similar bill, H. R. 3650 in the House and has been authorized by the Committee on Interstate and Foreign Commerce to report it favorably.

The House Committee on Interstate and Foreign Commerce on April 20 ordered a favorable report on the bill introduced by Mr. Esch, H. R. 328, which was also reported at the last session, to confer on the Interstate Commerce Commission jurisdiction over the exchange, interchange and return of cars with especial authority in emergencies. This bill will probably be considered in connection with war legislation.

Other bills that have been introduced are as follows:

S. 1728, by Senator Chamberlain, April 16, 1917. To Committee on Interstate Commerce. To protect interstate railways from injury by trespassers.

H. R. 3349, by Mr. Adamson, April 18, 1917. To Committee on Interstate and Foreign Commerce. To authorize the President in time of war to give direction to exports from the United States so as to insure their wise, economical and profitable distribution to other countries.

H. R. 3350, by Mr. Adamson, April 18, 1917. To Committee on Interstate and Foreign Commerce. Substitute for H. R. 2901, by same author, introduced April 13, 1917, to authorize President to take over railroads for military purposes. In the new bill, section 5, which was quoted in last week's issue, page 826, is stated as a proposed amendment to the provision in the army appropriation bill approved August 29, 1916, which empowers the President "in time of war, through the Secretary of War, to take possession and assume control of any system or systems of transportation or any part thereof, and to utilize the same to the exclusion, so far as may be necessary, of all other traffic thereon for the transferring of transportation of troops, war material and equipment or such other purpose connected with the emergency as may be needful or desirable."

H. R. 3339, by Mr. French, April 18, 1917. To Committee on Interstate and Foreign Commerce. To compel common carriers engaged in interstate commerce to adopt uniform rules for the operation of railroad trains and to use a uniform system of signals for authorizing the movement of railroad trains.

S. 2001, by Senator Gronna, April 21, 1917. To Committee on Interstate Commerce. Requires common carriers to transport all goods and property entrusted to them for carriage without unreasonable delay. Live stock accepted for carriage must be transported at a rate of not less than 20 miles per hour, including stops for feeding and other purposes. No live stock shall be unloaded without the consent of the shipper unless necessary in order to comply with the laws regulating the shipment of live stock or made necessary by some cause not within the control of the carrier. For unreasonable delays the shipper shall be entitled to recover damages.

H. R. 3638, by Mr. Dillon, April 23, 1917. To Committee on Interstate and Foreign Commerce. To secure co-operation between the Interstate Commerce Commission and state railway commissions in correlating, changing and establishing of intrastate rates, charges, and fares which indirectly affect interstate commerce, and providing for procedure relative thereto. This bill would authorize one or more members of the Interstate Commerce Commission to enter into conferences with and to act jointly with state commissions in rate matters for the purpose of fixing reasonable intrastate rates in relation to the interstate rates and other intrastate rates upon the initiative of one or more of the state commissions or upon complaint of shippers or passengers. It is provided, however, that the Interstate Commerce Commission shall not be authorized to initiate by itself alone any change in intrastate rates.

Canadian Railways in the Fiscal Year 1916

War Business Makes a New Record for Gross Earnings.
New Record Also in Train Loading and Car Loading

By J. L. Payne

Comptroller of Statistics, Canada.

THE Treitschke-Von Bernhardi school of thought in Germany was not wholly wrong in its teachings with regard to war. While all that Sherman said on the subject is pitifully true, there are, thank God, compensations. We are discovering that in Canada amid the waste and anguish which our participation in the great European conflict has brought upon us.

When Germany struck the tocsin in 1914, the railways of the Dominion had definitely crossed the divide between swelling prosperity and a more or less sharp reaction. If the nations of Europe had not sprung at each other's throats, thereby causing a far-reaching curtailment of commerce, there can be no doubt that the statistical year ended June 30, 1915, would have shown a much more serious shrinkage of gross earnings than did 1914. The contraction had actually begun in February of the war year. It was well under way when the call to arms roused the manhood of the country to a noble response. The war was blamed for what followed; but it was only partly to blame.

Had the dogs of war been held in leash we should still, inevitably I think, have had ample cause for feeling chastened by the touch of adversity. Canada was due for a check upon her high optimism with regard to railway construction. We had been paying too large a premium for mere haste in reaching the goal of larger transportation facilities. What would have developed slowly, came swiftly to a focus when the clash of arms broke upon the world. The stoppage of railway building which then occurred rather suddenly would have just as surely been brought about by other causes already grown formidable. The fundamental law of supply and demand would have refused to be further ignored, and the outbreak of war, rightly viewed, merely hastened the rebuke.

Let us see what happened. Construction did not stop absolutely; but it stopped in the case of every project for which financial arrangements had not been completed. Sobriety, stern and searching, succeeded to a fifteen years old debauch. Everybody began to think. The conviction quickly became general that we should require all our available sagacity to avoid a serious attack of indigestion. We had more trans-continental mileage than we could comfortably assimilate. Five years ago there was an insistent cry—to parody Lord Kitchener's memorable manifesto—for railways and yet more railways. In 1916 we discovered that we could really tear up and lend 1,500 miles of our precious lines to France. But the realization of what impetuosity had already cost led us to seek wise counsel before taking further action in respect of the situation as a whole; so government called in a commission consisting of Alfred H. Smith, president of the New York Central; Sir Henry Drayton, chairman of the Board of Railway Commissioners, and W. M. Acworth, of England, to give expert advice.

This commission was assigned a staggering task. It has not, up to this time of writing, finished it. The Canadian Northern, after building upwards of 10,000 miles of line between the Pacific and the Atlantic, had found itself short some eight or ten millions per annum as between net earnings and fixed charges. In fact, it would not be difficult to show that the shortage between immediate surplus and financial soundness was considerably larger. That was enough to bother any country which looked to its railways to bring speedily the fulfilment of its high hopes of destiny; but there was another trouble equally grave calling for at-

tention. The Grand Trunk Pacific had also fallen into difficulty—the road which was to save Canada from the humiliation of being unable to deliver to an eager market the products of her fertile prairies in the west. Now, these two roads are fundamentally unlike. The former is a somewhat makeshift, out-at-the-heels sort of line, needing a great deal to bring it up to standard; the latter is first class in every respect. All that the Grand Trunk Pacific lacks is traffic. The Canadian Northern has a fair measure of business and a good grade, but it is poorly equipped and overweighted in all directions.

Under ordinary circumstances, both roads might have been left to work out their own salvation, but for a single and rather vital consideration: The federal and provincial governments had guaranteed their bonds. The fate of the trustful endorser hovered on the horizon. Pending a prescription from the physicians, government advanced \$60,000,000 to the Canadian Northern and \$8,000,000 to the Grand Trunk Pacific as a brace against immediate collapse, and what the experts have been asked to do is to advise the people of Canada what should be done in these trying circumstances.

Hard hit by the war, following swiftly upon an accumulation of adverse conditions arising from various causes, it might be suspected that these observations will develop somewhat naturally into a hard luck story from the railway point of experience. Not so. It is going to be an inspiring tale, with the gloom stuff entirely eliminated. I have long believed that you cannot find a more resourceful or plucky class of men than has, by the very possession of such qualities, been given charge of the railway interests of Canada and the United States. These men promptly "dug in," to borrow a war phrase of deep significance, and proceeded to meet the onslaught of adversity with fine determination. Throughout what follows will be recognized the bright red line of compensation to which allusion has been made.

In 1916, the railway managers of Canada made a new record in gross earnings. In 1914, a shrinkage of \$13,619,164 had occurred, followed in 1915 by a further decline of \$43,240,467. From the high level of \$256,702,703 in 1913, the drop had been to \$199,843,072 in 1915. What they did last year was to make up all this loss and carry the aggregate to \$263,527,157—a clear gain of \$63,684,085 over 1915, and \$6,824,454 over the high water mark of 1913. This splendid and inspiring result was due in large measure to better freight business. The earnings from that source were \$184,099,887, as compared with \$132,543,984 in 1915. In making this good showing, gross per mile of line was advanced from \$5,616 to \$6,943. It must be remembered, as I shall make plain in a moment, that large additions to operating mileage during recent years have seriously reduced all averages when measured by that standard. Incidentally, gross earnings per freight train mile rose from \$2.579 to \$2.686 and per ton from \$1.520 to \$1.679.

It may be interesting to your American readers to know that earnings from mail and express services have steadily risen in Canada during the past decade. As between 1910 and 1916 there was a betterment by 70 per cent in the total remuneration paid by Government for the transport of mail matter, while express showed a gain of 65 per cent. There is a uniform rate, wherever practicable, of 16 cents per car mile for the movement of mail cars, while the average rate

for express privileges varies between 48 to 55 per cent of gross earnings. The railways are not concerned very much over the express situation, since they own and operate practically all the companies in Canada; but they are moving earnestly for better mail rates, and are greatly encouraged by what was done in this regard last year across the boundary.

It was, however, in net earnings that the railway managers scored their most conspicuous triumph in 1916, and right there the red line stands out boldly. They knew they were in for a hard fight after the setbacks of 1914 and 1915. The situation provided the severest possible test of administrative ability; but they met it. In the banner year 1913, the immediate difference between gross receipts and operating expenses was \$74,691,013. In 1915 it was \$52,111,973. In 1916, the record of 1913 was surpassed and a credit balance of \$82,984,898 created—a really excellent achievement. This was done without skimping of sound operating requirements; for maintenance of way and structures, which was equal to 19.74 per cent in 1913, stood at 19.96 in 1916, and maintenance of equipment was lowered merely by .64—from 20.48 to 19.84. Prudence dictated the reduction of staff where practicable; but wages held firm, and, on the whole, there was an advance in the scale. This is reflected in the fact that the cost of operation per train mile, despite all economies, rose from \$1.585 to \$1.623. This was slightly better than the showing for 1913—\$1.659—but with that exception it created a new high level. On the other hand, earnings per train mile were increased from \$2.144 to \$2.358.

The betterment in earnings per train mile was brought about by various means. There had not been any material advance in freight rates. In fact, the average receipts per ton per mile fell from 7.51 mills to 6.53 mills. The volume of freight was increased from 87,204,833 tons in 1915 to 109,659,088 tons in 1916—a new mark. This was accompanied by the raising of the average trainload from 344 to 411 tons, and the average carload from 18.43 to 20.91 tons, in which respects one sees the best results of executive skill in meeting the pinch of circumstances. Any comparison of trainloads which ignores ruling grades is obviously misleading; but it might be conceded that the average had nevertheless been low in Canada. Answering to the nudge of necessity, our railway people showed that they could at least get well over the 400 ton mark in the matter of trainload; and this represents a gain on the side of permanent capacity to earn, which is just a shade better than the capacity to reduce operating cost. The growth of trainload since 1907 is shown in the following statement:

	Tons		Tons
1907.....	260	1912.....	325
1908.....	278	1913.....	342
1909.....	278	1914.....	353
1910.....	311	1915.....	344
1911.....	305	1916.....	411

A betterment of nearly 60 per cent in ten years must be regarded as satisfactory.

It will save time and space at this point to run in, perhaps a little disconnectedly, a few statistical facts bearing on the general railway results for 1916:

Miles in operation.....	37,434
Capitalization.....	\$1,893,877,819
Passengers carried.....	49,027,671
Passengers per mile of line.....	1,309
Tons of freight.....	109,659,088
Tons per mile of line.....	2,929
Receipts per passenger mile, cents.....	1.954
Receipts per ton mile, cents.....	.653
Average passengers per train.....	53
Average passenger journey, miles.....	55
Average tons per train.....	411
Average freight haul, miles.....	199
Average revenue per ton.....	\$1.679
Tonnage per mile of line.....	2,929

The drop in average ton mile earnings, in the face of unchanged rates, is explained almost wholly by the fact that one quarter of all the freight traffic in 1916 consisted of products of agriculture. The highest previous percentage had been 19.34 in 1912. The average for nine years prior to 1916 had been 17.41. As a slight offset to the diluting

effect of an unprecedented volume of low grade freight, it should be pointed out that there was a decline of 3.37 per cent in the amount of products of the mine hauled. As between low grade and high grade freight, the proportion was 74.34 to 25.66. In view of the campaign now under way for the stimulation of food production, it would seem probable that the ton mile earnings will fall still lower in 1917; but the excellent operating results for 1916 rather warrant the presumption that our railways need not worry.

The addition to capitalization in 1916 was comparatively trivial—\$18,066,886—which gives emphasis to conditions in the money market. The average increase during the preceding ten years had been \$80,992,925. Stocks represented \$848,269,488 in the total, and it may be of concern to your readers to know that barely \$420,607,257 of this amount was on a dividend paying basis. The average rate was 7.68 per cent on such stocks; but the total amount available for dividends was equal to only 3.81 on all stocks. Capitalization in stocks was equivalent to \$25,950 per mile of line affected and bonds to \$27,282. From these calculations 4,178 miles of state railways are eliminated, which showed capital cost of \$306,053,937. The consolidated debenture stock of the Canadian Pacific, totalling \$176,284,882, created a further lien of \$14,239 per mile applicable only to that system.

Despite the hampering conditions of the past three years, 1,852 miles of new line were brought upon an operating basis in 1916. It was also ascertained that 3,150 miles of road were under construction, two-thirds of which was in a state of permissive operation. The mileage added and the mileage under way lie almost wholly in the western provinces. The development of mileage west of Ontario has really been remarkable, albeit it is directly associated with our present troubles. In 1880, there were not 200 miles of railway in the provinces of Manitoba, Saskatchewan, Alberta and British Columbia. At the present time there are 18,186 miles, or more than there were in the whole Dominion as recently as 1900. The rapid growth of railways in Canada is aptly illustrated by the fact that an average of 2,117 miles has been added annually since 1910. The 40,000 mark will be passed within two years, and it does not call for special prescience to forecast the stoppage of work for some time on lines running east and west and the construction of feeders only to existing trunk systems.

Canadian railways did not add to equipment in 1916. A shrinking traffic for two years had left them with an ample supply. Furthermore, an unparalleled addition to freight cars had been made in the first year of the reaction, 1914. There were mild complaints of shortage in the autumn of 1915, when the railways were called upon to move a phenomenal harvest before the onset of winter; but there was little justification for the outcry. The lack of box cars applied to a period of not more than two or three weeks, and it is proverbial that the impatience of shippers is at all times easily aroused to articulation. The fact is, a railway like the Canadian Pacific is obliged to have a heavy surplus of cars for nine months in order to meet the pressure which occurs in not more than three.

If the meditation which is now going on in Canada with regard to transportation problems should lead to a better judgment than has at all times prevailed in relation to real values, the experience will not have been in vain. While the very enterprises which have led to the present grave situation were under way there developed in Canada a vigorous agitation for the creation of one or more waterways. This was in disregard of Professor Harold G. Moulton's sane conclusion, after exhaustive investigation in many lands, that "there can no longer be any question that so far at least as canals are concerned, the cost of transportation, all factors included, is almost universally much greater by water than by rail. It is only in the case of very short canals which connect long stretches of naturally navigable waters that they

can have any economic justification at the present time. * * * * * To attempt now to return to the antiquated system of transportation of a half-century ago, or to make canals an integral part of a national transportation system, whether for the carriage of high-class or low-grade freight, it matters not, is to attempt to turn backward the clock of time." The enlargement of an existing canal system, in order to provide better facilities over waterways naturally navigable, is a very different matter from the construction of a new, costly and almost wholly artificial channel. A proper appreciation of the relative value of railways and canals ought, at this stage of progress, to prevent the serious advocacy of immense outlays for the creation of long stretches of canalized river and minor bodies of water. Canada certainly cannot afford to make any mistake in such matters.

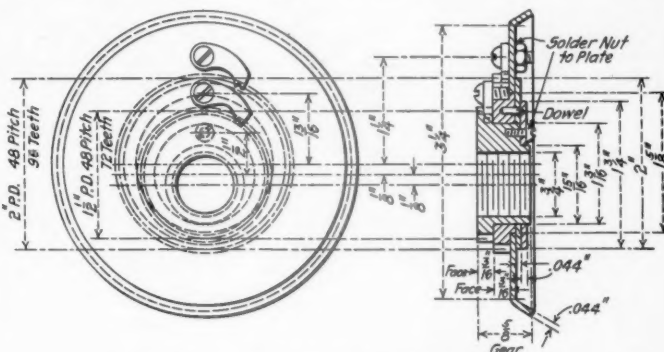
There has grown up during recent years considerable force of hostile opinion with respect to the important place given to certain commodities in measuring the need for new lines of railway. The west, for example, very naturally thinks about the movement of the grain crop, and it goes without saying that the whole country is concerned in the matter; but it is being pointed out there are other interests which should not be overlooked. The demand is made for more comprehensive planning. The northwest has vast deposits of coal, suggesting industrial potentialities. The development and peopling of the great prairie provinces will be a slow process, while grain growing and grain marketing is the sole industry. In the larger scheme it is clear that the distribution of railway accommodation must play a prominent part. In other words, thoughtful men are suggesting that railway extensions should be made to serve many interests rather than one or two. The consumer is also insisting on being considered along with the producer. He fears that in many ways his claims have been ignored too long. These are some of the aspects of thought which may be said to be growing out of the process of groping for better things at this critical period of our history as a young and sorely tried nation.

SIGNAL LAMPS WITH REFLECTORS

The electric signal lamps now in use on the New York division of the New York, New Haven & Hartford, in connection with the new automatic block signals being installed (on the main line, four-track, New Haven to Mount Vernon, 60 miles) in place of the controlled manual block system, heretofore used, are fitted with powerful reflectors and are used both night and day, though the signals are not light signals, strictly speaking. That is to say, the semaphore arms, worked by motors, are retained, and the light indications are given by moving different colored glasses into position in front of a single lamp, by the ordinary well-known means. These new signals are already in use between Bridgeport and Greenwich, about 30 miles, and are giving marked satisfaction. Even in bright sunlight the colored electric lights are seen by approaching engineers, in most cases, before the semaphore arm comes into view, and substantially all train movements are, therefore, made by light signals.

The primary reason for improving the lamps was the necessity of using very small semaphores, this being due to the limitations of space imposed by the overhead structures of the electric propulsion system. The semaphore blades are only 22 in. long, the signals being attached to the underside of the bridges and being limited at the lower end by the clearance requirements of the electric locomotives and their pantograph conductors. To adopt light signals, pure and simple, for this very busy high-speed division, was not deemed advisable, especially in view of the unsettled questions concerning electric headlights on locomotives, and the possible disturbing effects of strong lights on unlighted colored signal glasses. "Light signals," of the usual type, the

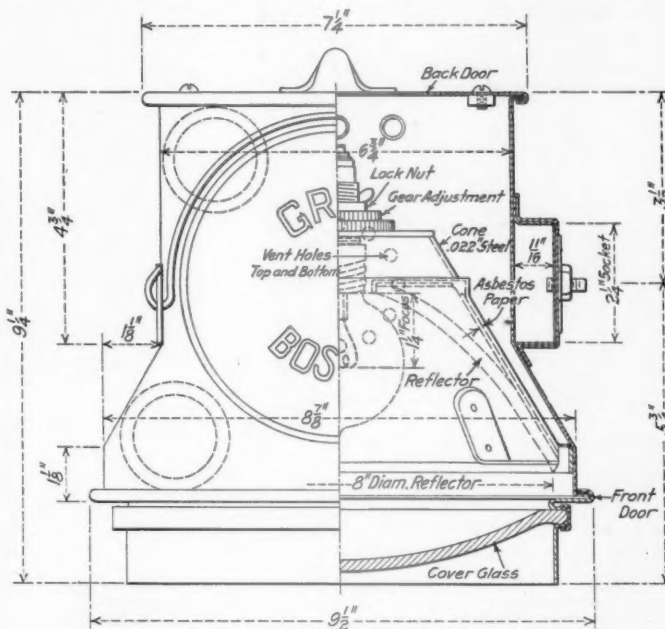
green signal to be always green, whether energized or unenergized; the red always red, and the yellow always yellow, cannot have reflectors, because of the danger that the locomotive headlight might illuminate a green (proceed) signal, when the true signal was red (stop); and without reflectors such signals are not yet accepted everywhere as entirely satisfactory for the highest speeds. This difficulty with light signals—that a powerful headlight may illuminate a green signal glass which is supposed to be dead, and thus produce



Adjusting Disks for Electric Signal Lamp

conflicting indications—is not present in the new arrangement on the New Haven, for the colored semaphore glasses which, in any given position of the signal, are not in use, have nothing behind them that will reflect the rays from the headlight; while the color which is in use can, of course, suffer no detriment from the excessive light. If it is red the headlight can only make it a more intense red; if green a more intense green.

Under these conditions the use of reflectors becomes feasible, and the problem of producing a colored light of suffi-



Electric Signal Lamp with Eight-Inch Reflector

cient intensity to serve for high speed signaling in the daytime is comparatively simple. But, while the New Haven thus has produced a satisfactory system of light signals, it has not secured the economy of operation which is peculiar to light signals, as the term is ordinarily understood, nor has it done away with moving parts, as in systems which dispense with the electric motor.

The new lamp is the product of developments begun in September, 1915, most of the experiments having been made at the factory of Peter Gray & Sons, East Cambridge, Mass. A large number of tests were made with different kinds of

reflectors and lenses, the apparatus being fixed on the roof of the factory and photometer readings taken from a point about half a mile distant. These tests were made in all kinds of weather and under unfavorable conditions of dust and smoke, as well as in clear atmospheres. The reflector finally adopted is one known as the "golden glow" used to a considerable extent on automobiles. It is of glass, with a silvered back, parabolic, 8 in. in diameter. The reflector has a hole, $1\frac{1}{2}$ in. in diameter, in the center of the back and in this is mounted a special spherical electric lamp with a horizontal spiral filament. The difficulties, well-known to signal engineers who have sought the most efficient signal lamp, in adjusting the filament at the most effective point, have been met by means of an ingenious mechanism designed by Messrs. Gray & Sons and on which patents have been secured.

This adjusting mechanism consists of two gears, one of which, the inner, is threaded to hold the lamp socket and is mounted eccentrically within the other. The second or outer gear is mounted eccentrically in the brass cone-head containing the reflector.

With this arrangement the filament of the lamp can be adjusted in any direction, laterally or vertically, and when

is transmitted to the lantern at a higher voltage, which on the New York division of the New Haven road is 70 volts. Each lantern is equipped with an auto transformer (see interior view, upper left hand corner), stepping the current down from 70 volts to 7 volts. These transformers are also made by the General Electric Company. The efficiency of the transformer at full load is guaranteed to be not less than 90 per cent. The lamps are operated on $3\frac{1}{2}$ volts at night and to change from 7 volts they are controlled by relays worked from the nearest signal cabin.

The socket of the lamp is of special design, and has no springs, so that there is no possibility of any light failures due to springs losing their temper and breaking contacts. The reflector is mounted in a sheet metal cone, lined with asbestos paper, and is attached, by means of clips, to the four lugs by which the cone is fastened to the lantern. These lugs are all insulated at the corner braces of the lantern through which they are attached.

The lantern is made of sheet steel, the main parts .039 in. thick; and is tinned all over before being black japanned. It has vertical sliding doors, front and back. The front door carries a convex cover-glass to protect the reflector from dirt and the weather. No lenses are used. The out-



Electric Signal Lamp with Eight Inch Reflector

it has once been brought to the true axis of the reflector, each gear is locked in position by means of independent pawls. The socket is then adjusted, forward and backward, by turning it through the threaded gear until it is brought into the exact focus of the reflector, where it is locked by means of a wing check-nut on the back. The filament consists of seven consecutive coils. It is left in a horizontal position, with its longest axis crosswise of the track. So placed, its rays strike the reflector so that the light is spread laterally more than up or down.

The lamps, made by the General Electric Company, are rated at 8 volts, 40 watts and 1000 hours' life. In the day time the lamp is operated at 7 volts, consuming 35 watts, resulting in greatly increasing the life of the lamp. However, no lamp is used more than 1000 hours, the aim being to maintain uniformity in all lamps.

In order to procure a low and uniform voltage at the lamp with a minimum loss in the transmission, the current

side socket is provided with adjusting screws for lining up the lantern.

The roundels used in these signals are 8 in. in diameter, rounded surface, of Corning "high transmission" glass. The colors do not exactly conform to the density of the R.S.A. standard but when used with these lamps they give the shade required.

The lamps, when operated at 7 volts, 35 watts, develop approximately 14 candle power. With the reflector they project a beam of light which measures, within a radius of 2 deg. of the axis of the beam, from 6500 to 7000 candle power. This intensity diminishes to 1000 candle power at the extreme of 5 deg. laterally from the axis of the beam. One of the reasons for adopting the design without the lens was to get a lamp that could be readily seen in daylight from a train approaching on a curve.

For the description of this lamp we are indebted to the makers, Peter Gray & Sons.

Pere Marquette and Cincinnati, Hamilton & Dayton

Interstate Commerce Commission Report on Reasons for Bankruptcy—Condemnation of Bankers' Methods

THE Interstate Commerce Commission has made a report covering 223 printed pages, with an appendix of 35 pages and numerous tables, on the Pere Marquette and Cincinnati, Hamilton & Dayton. The following are the introduction and the conclusions to this report:

INTRODUCTION

It may be well at the outset to marshal the outstanding facts, among the many disclosed of record, which have affected the ability of these two carriers to do their duty as common carriers and also the value of their securities in the hands of the investing public.

The Pere Marquette came into being as a consolidation of three relatively unsuccessful Michigan roads and began operation on January 1, 1900. The consolidation was brought about by New England interests headed by W. W. Crapo and Nathaniel Thayer, and in the process outstanding capital stock in the hands of the public was inflated by \$1,461,250 and book value of property by \$4,290,230.41. The Crapo-Thayer control continued for three years. Its operating policies were sound in the main; rolling stock and miles operated were increased; a small surplus was accumulated and used for improvements; no common-stock dividends were paid, and physical condition was bettered. Outstanding long term debt was increased by almost \$6,000,000 and at the end of the three years was about \$31,000,000. In the next 12 years it was increased by more than \$50,000,000 under the succeeding managements.

The first of these was the Prince management, which secured control on December 29, 1902, through purchase of Pere Marquette common at a maximum of \$85 per share. Its policy of expansion included acquisition of new equipment costing over \$6,000,000, and of about 383 miles of main and branch lines, most of which had a history of failure. In acquiring this mileage underlying bonds of over \$4,000,000 were assumed and almost \$3,500,000 bonds issued.

The Prince interests reversed the policy of their predecessors, undermaintained the road and equipment, paid unearned dividends on common stock, and, in the 18 months of their management, added \$2,500,000 net to current liabilities, also added over \$14,500,000 to outstanding long term debt, promoted a Cincinnati, Hamilton & Dayton syndicate, and through it sold 110,000 shares of Pere Marquette common to the Cincinnati, Hamilton & Dayton at \$125 per share.

The next management was that of the Cincinnati, Hamilton & Dayton syndicate, which took control of both carriers on July 7, 1904, and parted with it in the following month to the Zimmerman-Hollins interests. During these few weeks new and heavy burdens were bound upon the Pere Marquette.

The Zimmerman-Hollins management succeeded to the control in August, 1904, and continued the work begun by the Prince interests, with the result that when the control of both roads was sold to J. P. Morgan & Company on October 20, 1905, both were promptly put under the first receiverships which began in December, 1905.

Meantime another \$10,000,000 of long term Pere Marquette securities had been marketed through interested parties at a cost to the road of over \$1,100,000 in discounts, \$1,645,000 was paid to certain members of Hollins' pool for their worthless stock in the Toledo Railway & Terminal Company, \$400,000 was advanced under syndicate schemes to affiliated companies and lost, and over \$1,100,000 was used to pay

off floating debts contracted by the Prince régime. The mileage and equipment were somewhat increased. Operation was unsuccessful and resulted in deficits.

Two years of receivership were succeeded in December, 1907, by a Morgan reorganization based on the consolidation of the Pere Marquette with its already controlled Pere Marquette of Indiana, 20 miles long. This furnished the pretext for further stock inflation, for an issue of \$5,000,000 of 6 per cent debentures, and for the writing up as "cost of road and equipment" of the direct losses, aggregating almost \$5,000,000, of the former administrations. Morgan control has continued since, except for the second receivership, which began on April 5, 1912. In the intervening years the Pere Marquette was in constant difficulty, revenues failed to provide for expenses and charges, and bond interest was paid only at the cost of adequate maintenance of the property. Road and equipment deteriorated markedly, financing became more and more difficult, and needed funds were secured only at the expense of heavy discounts. The second receivership was necessary to accomplish what the first had failed to accomplish, the physical and financial rehabilitation of the Pere Marquette.

The road is now emerging from the second receivership. During five years of court control it has greatly improved in physical condition, and its service has improved accordingly.

Under the reorganization plan a large part of the fixed interest-bearing obligations outstanding on June 30, 1916, are to be exchanged for capital stock, of which there is to be \$11,200,000 of 5 per cent prior preference, cumulative, \$12,429,000 of 5 per cent preferred, cumulative, and \$45,046,000 of common shares. The plan contemplates a decrease of over \$8,000,000 in capitalization, exclusive of overdue interest on funded debt amounting to approximately \$10,000,000, and a considerable decrease in fixed interest charges. The new capitalization will also represent \$16,000,000 of new money provided for reorganization expenses, additions and betterments, working capital, and other purposes.

In contrast to the Pere Marquette the Cincinnati, Hamilton & Dayton, prior to July 7, 1904, when the Cincinnati, Hamilton & Dayton syndicate took control, was a highly prosperous road, despite losses of several millions through Henry S. Ives and his associates in the late eighties, the drain of supporting less prosperous lines west of Hamilton, Ohio, a funding of deficits and interest on the western lines into some \$1,800,000 of bonds, and the injection in 1895 of \$10,200,000 of water into the capital stock through the consolidation effected by the Shoemaker-Woodford interests, then in control. These interests sold out to the Cincinnati, Hamilton & Dayton syndicate in 1904, receiving \$125 per share for their common stock, which was water, and \$110 per share for 10,000 shares of preferred stock. The surplus of that date was replaced in the following year by a deficit of at least \$1,086,127.49, allowance being made for some \$843,000 concealed by falsification of accounts.

In organizing the syndicate Prince and his Pere Marquette associates had joined with promoters of the Toledo Railway & Terminal Company, a new and unsuccessful belt line at Toledo, which cost \$2,610,000 and ultimately yielded those promoters a profit of \$2,190,000. The story of this company is told in Appendix 12. Nearly 75 per cent of the underwriting in the Cincinnati, Hamilton & Dayton syndicate was secured by promoters' pledges as to what the Cincinnati, Hamilton & Dayton or the Pere Mar-

quette, or both, would do. These included promised contracts to an express company and to manufacturers of equipment and appliances. And even after the underwriting was completed the syndicate managers were constrained to borrow over \$3,000,000 to acquire control on July 7, 1904. On the same day corporate action was taken to fulfill the pledges made and carry out the plans previously settled, involving large increases in fixed interest-bearing debt. The road then operated about 624 miles of single track, with 184 locomotives and 9,579 cars. In round numbers, its capital stock was about \$16,000,000 and its long term debt \$12,700,000. Its current assets exceeded its current liabilities by nearly \$1,000,000.

Holders of the 5 per cent preferred stock, which was noncumulative, were startled by the new debt and at once threatened proceedings in court for rescission. The matter was compromised by agreement that the company should retire such preferred stock at 110 of par. This necessitated fresh financing and the syndicate was obliged to surrender its month old control to H. B. Hollins & Company, who were to furnish the funds for retirement and be paid by the company a cash commission of \$100,000 and a bonus of \$12 per share and interest. The company was thus compelled by its management to pay over \$122 per share for its preferred stock, including shares issued from the treasury after the retirement began, instead of retiring it at par. Incidentally the fixed interest charges were again greatly increased.

The Zimmerman-Hollins interests retained control from August, 1904, to October 20, 1905, when they sold the common stock to J. P. Morgan & Company for \$160 per share. It had cost them with syndicate expense about \$140, and, as previously stated, never represented a dollar of investment in the property of the company. During the 14 months of their management the figure of miles operated was swelled by completion of a 12-mile extension, some trackage rights at Toledo, and a change in accounting methods as to 381 miles of a subsidiary. The number of locomotives was increased by 49 and of cars by 2,739 partly by the same process and partly by purchases. The capital stock was decreased, by retirement of the preferred, to \$8,302,404, but the long term debt was more than trebled, increasing the aggregate capitalization by twenty millions to \$48,008,871.85. The principal debt increase may be summarized as follows:

\$2,920,000 of 4½ per cent equipment trust obligations
 \$15,000,000 of 4 per cent collateral trust notes, \$9,388,000, issued to redeem 66,769½ shares of 5 per cent preferred stock and \$5,612,000 to refund noninterest-bearing purchase money collateral trust notes which had been issued in part payment for 110,000 shares of Pere Marquette stock.
 \$8,250,000 of 4 per cent refunding mortgage bonds issued in part payment for 110,000 shares of Pere Marquette stock.
 \$225,000 branch-line bonds, previously outstanding but not recorded as a C., H. & D. liability.

During the Zimmerman-Hollins control noncumulative preferred stocks were retired by the issue of fixed interest-bearing securities of much greater par value, and a Hollins syndicate reaped large profits; noninterest-bearing notes redeemable in common stock were in fact redeemed prior to maturity with fixed interest-bearing obligations, and Hollins took the profits; millions of Pere Marquette bonds guaranteed by the Cincinnati, Hamilton & Dayton were floated, and Hollins syndicates took more profits; utterly worthless stock of the Toledo Railway & Terminal Company was sold by the holders, among whom were Cincinnati, Hamilton & Dayton-Pere Marquette directors, to the Pere Marquette, and again Hollins profited. Finally, in anticipation of the sale to Morgan of their holdings of Cincinnati, Hamilton & Dayton, valuable properties and rights of the latter were transferred to their recently acquired Detroit, Toledo & Ironton. The income account proved the utter inability of the system to carry its load of debt, even though the accounts were freely falsified.

Morgan's purchase was on behalf of the Erie. The incidents of that purchase, its speedy rescission by the

Erie, and the assumption by Morgan of the obligation, are later set forth. Immediately after the control had been returned to Morgan a receivership was asked, and it began December 4, 1905.

The Cincinnati, Hamilton & Dayton continued in receivership until August, 1909. During the four years from July 1, 1905, to June 30, 1909, it failed to earn fixed charges by over \$5,584,000. The receiver issued his 6 per cent certificates for \$1,127,128, of which \$103,468 was used to purchase equipment and \$1,023,660 to pay interest on funded debt maturing January 1 and July 1, 1906. The current liabilities of the company also increased. About \$1,000,000 of equipment trust obligations were paid off.

In the early summer of 1908 the comptroller of the Baltimore & Ohio, after an examination at the direction of his executives, made an extended report in which the hopeless condition of the Cincinnati, Hamilton & Dayton was clearly shown. In the face of this report the Baltimore & Ohio board on February 5, 1909, authorized a committee to investigate the situation in the light of a Morgan proposal looking to purchase of the Cincinnati, Hamilton & Dayton stock and a readjustment of that road's finances. Their report was favorable to purchase, and this, with an extensive readjustment of the finances of the Cincinnati, Hamilton & Dayton, was arranged in the summer of 1909, the Baltimore & Ohio guaranteeing many millions of the new securities issued by the Cincinnati, Hamilton & Dayton.

It is difficult to determine just what actuated the Baltimore & Ohio management in taking over the Cincinnati, Hamilton & Dayton. Their original expectations had failed before the preliminary negotiations were completed. The Pere Marquette was not even inquired into, despite its recent release from receivership and the fact that the Cincinnati, Hamilton & Dayton was then carrying Pere Marquette common as an asset of \$13,750,000.

Operations of the Cincinnati, Hamilton & Dayton during the five years of Baltimore & Ohio control to June 30, 1914, resulted in deficits aggregating over \$7,450,000. Included in this is \$1,100,991.56 of direct losses on account of flood damage in the spring of 1913. Failure to negotiate Cincinnati, Hamilton & Dayton first and refunding bonds necessitated loans by the Baltimore & Ohio, and by June 30, 1914, the latter had advanced \$22,276,877.52 for construction, deficits, maturing equipment obligations, flood expenditures, and the payment at maturity on July 1, 1913, of \$11,557,000 purchase money collateral trust gold notes, with six months' interest thereon.

Not until after the facts had been disclosed in the course of *The Five Per Cent Case*, *supra*, did the Baltimore & Ohio's annual reports to its stockholders contain anything which would inform even the careful student that its Cincinnati, Hamilton & Dayton advances to July 2, 1913, had amounted to \$19,289,405. If that sum be reduced by the estimated value of the nonsystem securities pledged thereunder the net advances, of which the greater part represented loss, would be \$15,900,000. This latter amount exceeds by more than \$5,500,000 the net corporate income of the Baltimore & Ohio, after payment of dividends, for the four years to June 30, 1913. It is more than one-third of the amount paid in dividends during those four years. The rate of dividend on Baltimore & Ohio common in 1915 and 1916 was 5 per cent as against the 6 per cent previously paid.

The Cincinnati, Hamilton & Dayton again passed into receivers' hands on July 2, 1914. The deficit in the year ended June 30, 1915, was \$3,093,185.58, allowing for a full accrual of interest as theretofore. In September, 1915, the Cincinnati, Indianapolis & Western, owning the lines west of Hamilton, was foreclosed and sold, and Cincinnati, Hamilton & Dayton operation of the same ceased after November 30. For the year ended June 30, 1916, the deficit was \$1,356,554.47.

A reorganization plan was declared operative on April 7,

1916. Under it a new company will take over about 368 miles, comprising the lines from Cincinnati to Toledo and from Dayton to Ironton Junction, with some smaller branches. The Baltimore & Ohio is redeeming the Cincinnati, Hamilton & Dayton general mortgage bonds at 70 plus, and is to issue a new 4 per cent bond for cash requirements and refunding. After deducting collateral of an estimated value of \$3,368,000 from its actual and prospective outlay there will be left \$35,892,323 as its approximate net ultimate investment in the Cincinnati, Hamilton & Dayton, not allowing for \$3,274,000 interest for three years to June 30, 1916. In the fiscal year ended on that date the Baltimore & Ohio wrote off against surplus \$10,892,323, thus reducing its book investment in the Cincinnati, Hamilton & Dayton to \$25,000,000.

SUMMARY AND CONCLUSIONS

Up to June 30, 1904, the railroad operation of the Cincinnati, Hamilton & Dayton was highly successful, particularly as contrasted with that of the Pere Marquette. The former was thus enabled to carry along unsuccessful subsidiaries, by advancing moneys to meet their needs, and was strong enough to bear the losses which had resulted from the manipulations of Ives and his associates in the late eighties. The predecessors of the latter were subjected to successive receiverships and reorganizations in the endeavor to escape from operating deficits. In the old Cincinnati, Hamilton & Dayton dividends were the rule. With the predecessors of the Pere Marquette they were the exception.

Inflations of capital stock were incidents of the Cincinnati, Hamilton & Dayton consolidation in 1895 and of the Pere Marquette consolidation in 1900. This inflation was greater in the Cincinnati, Hamilton & Dayton than in the Pere Marquette because of their respective financial conditions. In neither case was it defensible.

The Pere Marquette after its organization in 1900 received three years of fair treatment from the Crapo-Thayer interests with some betterment of the property. But during the next 18 months it suffered at the hands of the Prince interests, who denied it proper maintenance, and so manipulated its accounts as to give color to their claim that it was earning the dividends on common stock which they paid. The new Cincinnati, Hamilton & Dayton, after its organization in 1895, had continued its successful career despite the inflation of its stock. It regularly earned and paid its preferred dividends, accumulated a substantial surplus, and reached June 30, 1904, with its property in good condition, although not so up to date as that of some of its competitors.

Of the Prince interests it must be said that while their earlier Pere Marquette transactions are properly within the competence of an administrative tribunal, only a court of criminal jurisdiction could adequately deal with their subsequent transactions as to both of these roads. This taint of criminality attaches to many of their associates in the Cincinnati, Hamilton & Dayton syndication of May 19, 1904, and even more to their successors in Cincinnati, Hamilton & Dayton control, the Zimmerman-Hollins combination of interests, including the leaders of the Toledo and St. Louis syndicates who promoted the Toledo Railway & Terminal Company.

It is difficult to comment upon what was done to these properties in 1904 and 1905 without applying to those who did it the terms which they richly merit. The promoters of the Cincinnati, Hamilton & Dayton syndicate of May 19, 1904, did not hesitate to wield the club of expected corporate control in order to force necessary subscriptions. Nor did they hesitate to pledge the credit of the Cincinnati, Hamilton & Dayton and Pere Marquette to further their own schemes. Only in degree were their acts less criminal than those perpetrated by their successors, the

Zimmerman-Hollins combination. The latter stopped at nothing, took every chance, and succeeded in their astounding coup of unloading their Cincinnati, Hamilton & Dayton holdings upon J. P. Morgan & Company at \$160 per share, when the Cincinnati, Hamilton & Dayton and its controlled lines were then ready to fall of their own weight.

It was in this connection that J. P. Morgan & Company became active in Cincinnati, Hamilton & Dayton-Pere Marquette affairs. That firm had for years been interested in the Cincinnati, Hamilton & Dayton, having held some 23,000 shares of its common stock, or about one-seventh of its voting power, from 1901 up to July, 1904, when 20,000 shares were sold to the Cincinnati, Hamilton & Dayton syndicate. It has been the endeavor of Morgan & Company throughout this proceeding to prove that they were not aware of the actual condition of these two roads when J. P. Morgan made the suggestion to President Underwood of the Erie which resulted in the latter's purchase of the Hollins holdings of Cincinnati, Hamilton & Dayton stock. We have stated in detail the many facts of record to the contrary. With all that the record shows as to the "free hand" of the Erie in making this purchase of the Cincinnati, Hamilton & Dayton, we find no reason to doubt that it was the Morgan influence in Erie affairs which dictated that purchase, and the Harriman influence which so soon thereafter forced Morgan to release the Erie from its bad bargain. Through that rescission of its contract of purchase the Erie escaped all loss.

It has been suggested that Morgan & Company's participation in the Erie purchase could be readily understood if they were the principals for whom H. B. Hollins & Company had acted throughout. This record contains no evidence to indicate such agency; and its existence was unqualifiedly denied by the representative of J. P. Morgan & Company who appeared before us.

Next came the receiverships of December 4, 1905. The two roads secured from these and from the reorganizations which followed no substantial relief. Their properties were not rehabilitated to overcome the lack of proper maintenance under the prior maladministration, and there was no permanent reduction effected in fixed charges to offset what had been loaded on them by the Prince-Zimmerman-Hollins cliques. In the case of the Pere Marquette, fixed charges were actually increased in a reorganization which had as its basis the consolidation of the parent company and its Indiana subsidiary of 20 miles in length. That consolidation was the excuse for further inflation of the capital stock by using treasury shares as a bonus to a new issue of funded debt and for writing up as a part of the cost of road and equipment of the "new" company some \$5,000,000 of worthless assets of the old. These "assets" included the direct losses suffered in the Prince-Zimmerman-Hollins exploitation. Those then in control of the Pere Marquette and its Indiana subsidiary petitioned for and secured the approval of that consolidation by the Michigan Railroad Commission, alleging in their petition and otherwise advising that body that the capital stock outstanding would not be increased.

Commenting upon the fact that the carriers in *The Five Per Cent Case*, *supra*, adopted the book value as the nearest and most accurate reflection of the value of railroad properties devoted to public service obtainable at the present time, we said in 31 I. C. C., at pages 361 and 362:

"The nature and unreliability of the property investment accounts of carriers have frequently been commented upon by the Commission. * * * While the property investment accounts are used herein for the purposes of comparison, it must be understood that they are not accepted by the Commission as evidence either of the actual cost or the present value of these properties."

Transactions such as that just mentioned, whereby some \$5,000,000 of worthless accounts become "cost of road and

equipment" by a few strokes of the pen, justify our refusal to accept property investment accounts as establishing actual cost. The history of the Pere Marquette abounds with situations productive of similar improper charges to such accounts. The consolidation of 1900 furnished the pretext to inflate cost of road and equipment by \$4,290,230.41. In the case of the Cincinnati, Hamilton & Dayton, the extensive stock watering of 1895 was very largely offset by charges to property investment accounts. The heavy expenses incident to the manipulations of 1904-1905 were for several years reported to this Commission as "cost of road and equipment"; in fact, it was not until the assumption of Cincinnati, Hamilton & Dayton control by the Baltimore & Ohio that such expenses were charged to profit and loss.

In the case of the Cincinnati, Hamilton & Dayton, the reorganization was entirely predicated upon the sale by Morgan & Company to the Baltimore & Ohio of Cincinnati, Hamilton & Dayton stock control and was characterized by the funding of defaulted interest and heavy expenses in order to avoid foreclosure and loss to the principal stockholder.

With respect to this purchase of Morgan holdings of Cincinnati, Hamilton & Dayton stock by the Baltimore & Ohio, our conclusions are based on what the record fails to explain as well as on what it does explain. The purchase was undertaken in the face of a most unfavorable report upon both present condition and future prospects, made by a Baltimore & Ohio official who had investigated the Cincinnati, Hamilton & Dayton at the instance of his directors. It may be that the directors chose to substitute their judgment for that of their representative. But we find nothing to explain why the purchase was still persisted in and carried through when the failure of negotiations with certain Cincinnati, Hamilton & Dayton security holders made necessary the assumption by the Baltimore & Ohio of obligations not theretofore anticipated, and the increase of the burden of interest charges to an extent which more than offset its original expectations of profit from this Cincinnati, Hamilton & Dayton venture.

It is manifest that the formal recitals as to the Cincinnati, Hamilton & Dayton purchase found in minutes of meetings of the executive committee and directors of the Erie, and of the executive committee, directors, and stockholders of the Baltimore & Ohio, contain only what it was considered necessary to record in justification of the course previously determined upon by those to whom executive committees, directors and stockholders were alike considered subordinate. The approximate net ultimate investment of the Baltimore & Ohio in the Cincinnati, Hamilton & Dayton will be \$35,892,323, not including three years' interest to June 30, 1916, aggregating at least \$3,274,000 at the rate of 5 per cent. Of this \$35,892,323 the sum of \$10,892,323 has already been written off as lost by the Baltimore & Ohio. The interest was not written off because it was never entered on the books. Under the proposed plan of reorganization the Baltimore & Ohio will own all of the stock of the new Cincinnati, Hamilton & Dayton. The latter will own about 227 miles of railroad, of which 59 are in the Cincinnati-Dayton section of the main line and the balance in branches, the physical condition of which is not so good as that of the main line. Much of the branch-line mileage is unproductive. It will also own a perpetual lease of another 141 miles, being the main line between Dayton and Toledo. The constructive capitalization of this 141 miles, based on the consideration named in the lease, would be \$43,000 per mile. The actual capitalization of the 227 owned miles is \$93,000 per mile. These figures, treated as those of a railroad owning 368 miles, give a per mile capitalization of \$74,361, underlying the Baltimore & Ohio's investment of \$35,892,323, or \$97,533 per mile without including interest, an aggregate of \$174,894 per mile.

Although the Cincinnati, Hamilton & Dayton at the time

it was examined by the Baltimore & Ohio was carrying an asset of \$13,750,000, representing its 110,000 common shares of the Pere Marquette, the latter was not made the subject of any inquiry by the Baltimore & Ohio. There is some ground for the belief that the subsequent purchase of those 110,000 shares by Morgan & Company was then in contemplation. Seemingly, also, the control of the Pere Marquette has been exercised by that house since the first receivership.

In the few years between its first and present receivership the Pere Marquette managed to pay its bond interest, but only at the expense of proper maintenance. Not until the year ended June 30, 1912, was there any really effective attempt made to keep up the property, and it is significant that the second receivership began on April 5, 1912. To such an extent were maintenance of the road, structures and equipment postponed that one of the chief problems of the present receivership has been the rehabilitation of the property. That rehabilitation has been thorough and its good effect has been noticeable in increased safety and economy of operation.

The Cincinnati, Hamilton & Dayton also suffered the evils of deferred maintenance almost from the close on July 7, 1904, of the successful Shoemaker-Woodford management. After the Baltimore & Ohio took it there followed in the year ended June 30, 1910, a considerable improvement in the character of the maintenance. This did not continue and the result was like that on the Pere Marquette. Revenues were seemingly inadequate to care for both fixed charges and continued proper maintenance. The spring flood in 1913 contributed to the ultimate result, but was by no means its chief cause. A second receivership began on July 2, 1914, and, since January 1, 1915, the work of rehabilitating the more important sections has been going on.

The exploitation in 1903, 1904 and 1905 of the Pere Marquette and the Cincinnati, Hamilton & Dayton was not an incident of railroad construction. The properties had long been established. Whatever control or regulation of the issue of railroad securities was exercised by the states in which these roads operate was inadequate to prevent the exploiting or to forestall subsequent hasty and unwise reorganization. To the extent that these flotations ultimately lodged in the hands of innocent investors, whether here or abroad, the public was deeply wronged. Whatever control or regulation was had of the properties and operations of the two roads was not sufficient to keep them in condition to satisfactorily serve the population dependent upon them. The result has been the same with each, financial disaster to the carriers, serious loss to the holders of their securities, deterioration of their physical properties, and a marked impairment of ability to perform their functions as public servants.

Nothing disclosed in the record before us is to be more regretted than the readiness of great banking institutions in our financial centers to loan enormous sums of money upon exceedingly precarious security in aid of such schemes as have been devised in the wrecking of these railroads. Not only this, but the high officers of such institutions, while acting ostensibly as directors of the railroads, have in fact been little more than tools and dummies for the promoters. The trustees of other people's money seem to have had little compunction about violations of their trust for the benefit of the promoters, and at their demand.

Can the like of what has befallen these two roads be made impossible hereafter? Perhaps not entirely, so long as financial circles continue complaisant toward financial exploitations which prove successful. But it will help if minority stockholders are more watchful of their interests and if bondholders assert their rights before their security fades away for lack of upkeep, purposely neglected in order to pay interest and dividends unearned. It would, in our opinion, render such exploitation more difficult if the issu-

ance and marketing of all securities of common carriers were subject to Federal regulation. As to that we renew the recommendations repeatedly made to the Congress in our annual reports. We also point to the lesson, here again taught, that access to correspondence files is indispensable for a thorough and accurate understanding of the motives and purposes which underlie the formal entries made in accounts and records.

Unwise management contributed to the downfall of these roads, but breach of trust by corporate officials, often for personal gain, was the main cause here, as in the records developed in other investigations. *Consolidations and Combinations of Carriers*, 12 I. C. C., 277; *The New England Investigation*, 27 I. C. C., 560; *St. Louis & San Francisco Railroad Investigation*, 29 I. C. C., 139; *Financial Investigation of N. Y., N. H. & H. R. R. Co.*, 31 I. C. C., 32; *Financial Transactions C., R. I. & P. Ry. Co.*, 36 I. C. C., 43. That downfall, with its deplorable consequences, can be traced only to betrayal within, and not to compulsion from without. Neither rivalry, nor rate level, nor regulation, nor all combined, can be found on this record to have contributed in any appreciable degree to the disaster.

In discussion of transportation conditions during the last two years or more much has been made of the fact that over 40,000 miles of our railroads were under receivership. A recent publication lists 69 railroads, among them the Perre Marquette and Cincinnati, Hamilton & Dayton, as in the hands of receivers on December 31, 1916. Their combined operations cover 34,559 miles. Over 40 per cent of that mileage is in systems which, as shown by our investigations, have suffered principally from financial mismanagement and exploitation. Over 40 per cent more, of which a large part is located in Texas, is comprised in two southwestern systems. The remaining 5,800 miles are distributed among fifty-odd carriers in different parts of the country.

ORGANIZATION OF A MILITARY RAILWAY REGIMENT

The formation of a military railway regiment to assist the army by the construction and operation of railways in connection with military movements is now being organized under the direction of S. M. Felton, president of the Chicago Great Western at Chicago. The new organization will consist of one company each from the following Chicago railroads: The Illinois Central, the Chicago Great Western, the Chicago & North Western, the Chicago, Milwaukee & St. Paul, the Chicago, Rock Island & Pacific and the Atchison, Topeka & Santa Fe. Several months previous to the declaration of war Mr. Felton, who was appointed consulting engineer and advisor to the chief of engineers of the United States Army at the time of threatened hostilities on the Mexican Border was directed to perfect plans for the formation of the new army unit.

Simultaneously with the entrance of the United States into the war, steps were taken to form the regiment. Each railway is furnishing one company of which the captain will be a division superintendent, the lieutenants a chief despatcher, an engineer maintenance of way, a road foreman of engines, and a trainmaster or master mechanic, and the remaining 164 men will be recruited from all branches of railroad service. Non-commissioned officers will be drawn from men of the rank of track supervisors, bridge supervisors, roundhouse foremen, assistant engineers, section foremen, bridge foremen, etc. Among the employees desired to fill the ranks are those holding such positions as conductors, brakemen, yard foremen, despatchers, track foremen, electricians, bridge and building foremen, car inspectors, wrecking foremen, storekeepers, traveling engineers, roundhouse foremen, locomotive engineers and firemen, stationary enginemen, switchmen, oilers, machinists, operators, yardmasters, pumpmen, linemen, locomotive inspectors, boiler makers, blacksmiths,

stenographers, surveyors, car repairers, clerks, carpenters, masons, pile driver men, plumbers, agents, etc. In addition to four commissioned officers for each company, consisting of a captain and three lieutenants, the railways will furnish two majors, two captain adjutants, one captain quartermaster, and one captain engineer. The colonel, the lieutenant colonel and his captain adjutant will be regular army officers.

The purpose of the organization is to provide a citizens' reserve from the various railways fitted by civilian occupations to perform the duties of military railway troops. The special duties of these railway troops when called out by the president in time of war will be to construct and operate any strictly military railroads that may be required, to reconstruct and operate railways which may have been captured on foreign soil, or, in the case of the invasion of the United States involving the capture and destruction of American railways, to reconstruct such railways as soon as they have been recaptured by our armies and to operate them until such time as it may be possible to restore their normal commercial operations.

Each company will be expected to be capable of taking over a section of railroad of approximately 100 miles in length and to operate it in the same manner that it might handle the work of a division on its own line. The engineering officers of each unit are also expected to be prepared to handle expeditiously the construction of any lines that military operations may necessitate. Those enlisting become members of the United States Engineer Enlisted Reserve Corps, while those commissioned as officers are admitted to the United States Engineer Officers Reserve Corps as provided for in the National Defence Act of June 3, 1916.

Those desiring to enlist must be between the ages of 18 and 45, must be citizens of the United States or must have declared their intentions to become so. The men are enlisted in the Engineer Enlisted Reserve for a term of four years and will be subject to 15 days' military training in a training camp each year. Each railroad will give a leave of absence for the purpose of permitting those of its employees joining the military railway company to get their annual training, which is the only service required of them under the law during times of peace.

In case of actual or threatened hostilities the men are subject to the call of the President of the United States for military service. This service will usually consist in the operation and construction of railway lines in the theatre of operation, but, if necessity arises, any other service may be required. All men in good physical condition will be re-employed at the end of military service at the ruling rate of pay at the time of their return in their old positions and rank, subject to the rules of the company in regard to seniority or other questions affecting service or employment. Each man when he enlists will be given military rank and when called into service either in peace or war will have the same rank as held in the reserve. When called into service either in peace or war he will receive the pay to which his military rank entitles him. All subsistence and medical attendance, clothing and material equipment as well as transportation to and from training camps will be furnished by the United States. When called into service the men are required to undergo a physical examination and, if rejected at this examination, will receive transportation back to their homes. After service at one training camp the men are entitled to wear a distinctive rosette which no person not in the reserve can wear except under penalty of law.

Posters containing details of the plans of organization have been placed in conspicuous places on the railroads above mentioned for the information and guidance of such employees as may desire to enter the service, which should be very attractive as it is a preferred service in every way. The men when called out are assigned to work they are accustomed to and relieved of the drudgery of the ordinary life of a soldier.

AN ALL-INGOT TEST FOR STEEL RAILS

By Geo. F. Hand

Assistant Engineer, New York, New Haven & Hartford,
New Haven, Conn.

The soundness test in the inspection of open hearth steel rail is now in quite general use, as it is realized that sound rail cannot be made from unsound ingots. As applied under the specifications of the American Railway Engineering Association, test pieces are cut from the top ends of the top rails of three (the second, middle and last) ingots in each heat, and in addition to the ductility tests these pieces are nicked and broken and examined for pipes, seams or slag inclusions; if one piece shows interior defects all the A, or top, rails are rejected and the test is carried to the B and C rails in turn; if none of the three pieces shows interior defects, all the rails in the heat are accepted (subject to the ductility tests). In present open hearth mill practice the heats of steel are quite large, from 20 to 35 ingots being poured from a single heat, and rejections based on the examination of but 3 of these ingots operate more as a penalty to improve the average of the rolling than as a means of weeding out the unsound rails. If none of the 3 test pieces shows interior defects, all the rails in the heat are accepted, defects in rails from the other 17 to 32 ingots remaining undiscovered. If one test piece shows defects all of the 20 to 35 rails of that position in the ingot are rejected whether good or bad.

The logical development of the soundness test is a test of every ingot, but the practical difficulties in the way of doing this have so far prevented the adoption of the all-ingot test in this country. The Algoma Steel Corporation of Sault Ste. Marie, Canada, is the pioneer in applying the all-ingot test commercially, and R. W. Hunt's paper, read at the 1916 convention of the American Railway Engineering Association, demonstrated the very considerable saving to the mill in rejections and the real protection secured by the purchaser. In the Algoma test the usual drop tests are made on pieces from the second, middle and last ingot, and in addition the top crop end of the top rail of every other ingot in the heat is nicked and broken by a bulldozer. All of the fractures are examined for interior defect as defined by the American Railway Engineering Association specifications, and also for segregation, as evidenced by a bright, fine-grained center, the individual A rails being rejected accordingly, and the test carried in turn to the B and C rails of individual ingots if necessary. Under this test it becomes necessary to stamp the ingot number on all rails in addition to the other marks, to identify the crop ends that are tested with the individual rails from which they are cut, and arrange the rails systematically on the cooling beds so that each rail of which the test piece shows defect, and rails required for retest, can be located.

The mills of this country have uniformly objected to this specification because of the reduced output which is expected to result from the large number of tests to be made and difficulties in locating rails to be discarded or retested. To obviate these difficulties the following method was suggested by the operating head of one of the rail mills, and applied experimentally to two heats of 107-lb. section rail.

The method of test is as follows: Test pieces are cut from the top rails of the second, middle and last ingots of the heat and are subjected to the usual drop test. The top rails from all other ingots in the heat are lightly cropped and then nicked at the base by the hot saw about one foot from the top end, care being taken not to cut into the head of the rail; the rails are then sawed to 35-ft. lengths and run onto the hot bed selected for the segregation of the A rails. All of these A rails are fed to the same straightening press where they are broken at the nick and the fracture examined by the inspector. Rails showing interior defects are rejected; those

with clear fractures are straightened and cold sawed to 33-ft. lengths. In this way the test piece remains attached to its rail until the rail is accepted or rejected and all the difficulties of identification disappear.

This method of test worked out very satisfactorily and was considered entirely practicable by the mill. Nicking the rail with the hot saw was done quickly and efficiently after the first few cuts and did not hold up the mill. The allowance of two feet additional to the usual length of the A rails was found to be sufficient to make the break at the straightening press and prevent "hooked end" rails. A cold saw should be set up near the straightening press to avoid unnecessary handling of the rail. This is the only change required in the ordinary mill equipment. The additional expense to the mill consists of a small increase in the piece rate to the cold straightener making the breaks, and a charge for the cold saw cuts. This increase is amply covered by the large decrease in rejections. The saving in rejected rail is best shown by Mr. Hunt's report of the Algoma rolling.

The detail results obtained on the two heats are shown below:

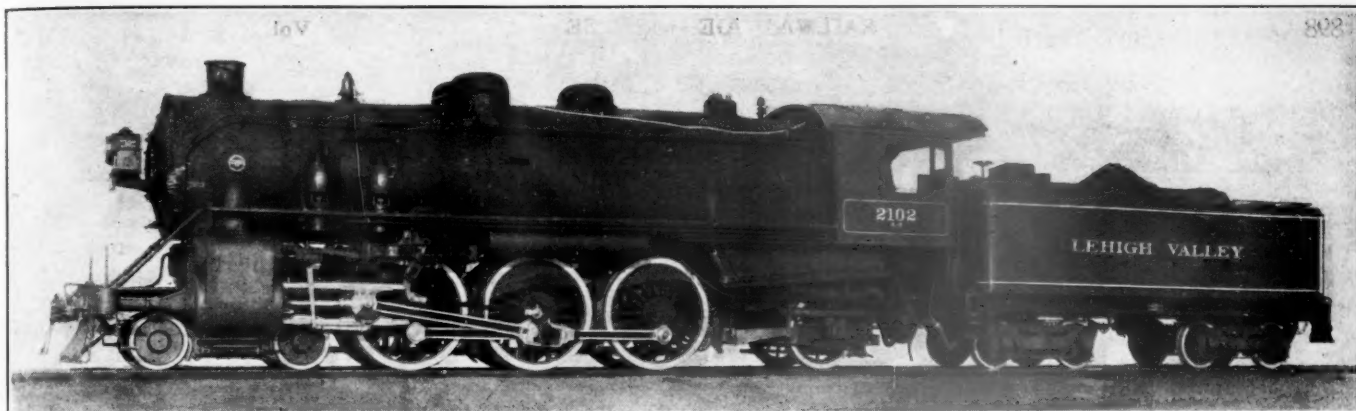
Heat X		Heat Y	
Ingot	Fracture	Ingot	Fracture
1	O. K.	1	Pipe
2*	O. K.	2*	O. K.
3	O. K.	3	2 1/2-in. pipe. Rail broken back 2 ft. at a time; 1 in. pipe 7 ft. from first fracture; 2-in. pipe at 9 ft. Fracture clear at 2 ft. from B end of rail.
4	Pipe		
5	O. K.	4	O. K.
6	O. K.	5	O. K.
7	O. K.	6	Pipe
8	Pipe	7	O. K.
9	O. K.	8	O. K.
10*	O. K.	9	O. K.
11	O. K.	10*	O. K.
12	Pipe	11	O. K.
13	O. K.	12	O. K.
14	O. K.	13	O. K.
15	O. K.	14	O. K.
16	O. K.	15	O. K.
17	O. K.	16	O. K.
18	O. K.	17	O. K.
19	O. K.	18	O. K.
20*	O. K.	19*	3 1/2-in. pipe. 2 1/4-in. pipe 2 ft. back, and 1-in. pipe 4 ft. back.

The starred ingots are those whose test pieces received the usual drop test. In heat X all three drop test pieces showed clear fractures, and all the rails in the heat would be accepted under the A. R. E. A. specifications, although three of the A rails were piped. In heat Y one of the drop test pieces showed pipe, and under the A. R. E. A. specifications all of the 19 top rails would be rejected, although 15 of these were sound.

This method does not contemplate carrying the test for interior defects further than the A rail of each ingot. It is not contended that a re-test on the B and C rails is not desirable, but the proposed method is submitted as a practicable means of eliminating unsound A rails, the defects in the lower rails being fewer in number and of less importance. Again referring to the Hunt report on the all-ingot test, this shows that of the A rails rejected for pipe, 44 per cent would have been accepted under the A. R. E. A. specifications; also, of the ingots with pipe in the A rails, only 3.3 per cent showed pipe in the B rails.

The visual test for segregation, as made by Mr. Hunt, was not applied in the experimental run described, but can be if desired, although the results are far from trustworthy.

COSTA RICAN RAILWAYS.—The railways of the Republic consist of the Pacific Railway of Costa Rica and the Northern Railway of Costa Rica (with its leased line, the Costa Rica Railway). The first named, extending from Puntarenas, on the Gulf of Nicoya (Pacific coast), via Atajula, to San Jose (69 miles), is owned and operated by the Costa Rican Government. The Northern Railway is owned by the United Fruit Company.—*Commerce Report.*



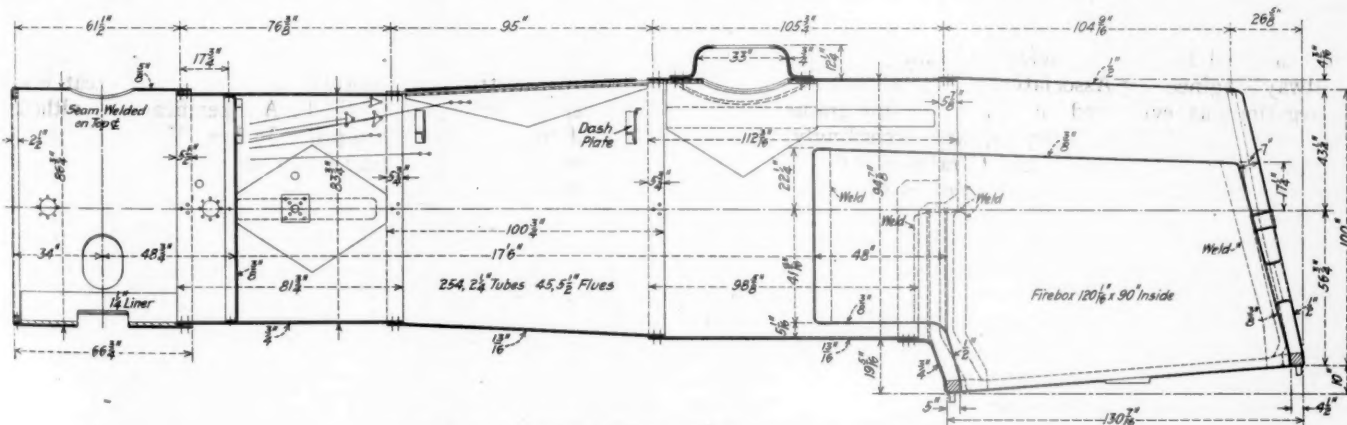
Heavy Locomotives for the Lehigh Valley

Freight Train Miles Decreased 50 Per Cent by Use of Powerful Pacific and 2-10-2 Type Locomotives

THE Lehigh Valley has reduced its train-miles in freight service on the Wyoming and Seneca divisions by the addition of 30 powerful Pacific type locomotives and forty 2-10-2 type locomotives, built by the Baldwin Locomotive Works. The Pacific type locomotives are used in fast freight service between Manchester, N. Y., and Coxton, Pa., which is near Pittston, a distance of 175 miles. They haul 50 loaded cars, both eastbound and westbound, and make the run in 5½ hours. By the use of these locomotives two fast freight trains which were previously hauled by heavy 10-wheel locomotives having a tractive effort of 31,000 lb. have been consolidated. From Coxton to Summit, N. Y., about 120 miles, there is a steady up-grade with many curves, the gradient running as high as 0.4 per cent. From Summit there is a down-grade to within seven miles of Manchester, where there is a steady rise with a 0.4 per cent grade 4.26

miles, with 0.4 per cent grades. These locomotives exert a tractive effort of 72,800 lb. and will haul 4,000 tons making this run in 6½ hours. They burn a mixture of fine anthracite and soft coal. Each locomotive replaces two heavy Consolidation locomotives, having a tractive effort of 36,000 lb. each.

The boilers of the Mikado, Pacific and 2-10-2 types are all of the same diameter at the front end and have the same number and diameter of tubes. The Mikado and the Pacific type locomotives have tubes 17 ft. 6 in. long, while the 2-10-2 type engines have tubes 21 ft. long. The fireboxes of the Mikado and Pacific type locomotives are different, in that the Mikado locomotives use a mixture of anthracite and soft coal and have 100 sq. ft. of grate area, as compared with 75 sq. ft. grate area for the Pacifics, which use soft coal. Both the 2-10-2 and the Pacific type loco-



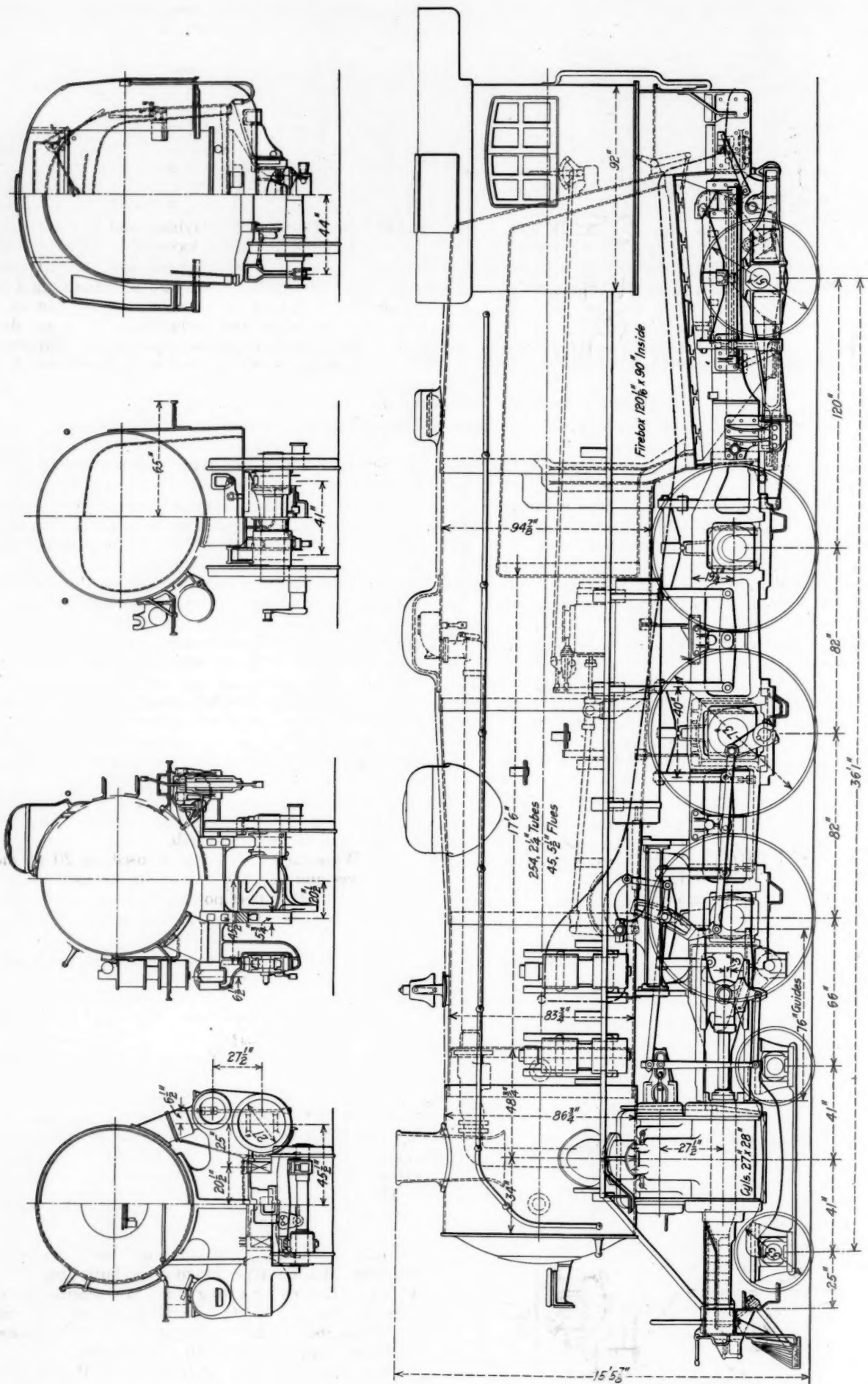
Boiler for Lehigh Valley Pacific Type Locomotives

miles long. The Pacific type locomotives are also used for heavy express passenger traffic on the Wyoming division which extends between Pittston and Athens, Pa., with a maximum grade of 0.2 per cent. These locomotives are among the most powerful of their type, exerting a tractive effort of 48,700 lb., or 55 per cent greater than the tractive effort of the 10-wheel locomotives which they replace. They are designed for burning bituminous coal and differ in this respect from the greater part of the motive power on the Lehigh Valley. They resemble in many respects the latest design of the Lehigh Valley Mikado locomotives, 20 of which were built in 1916.

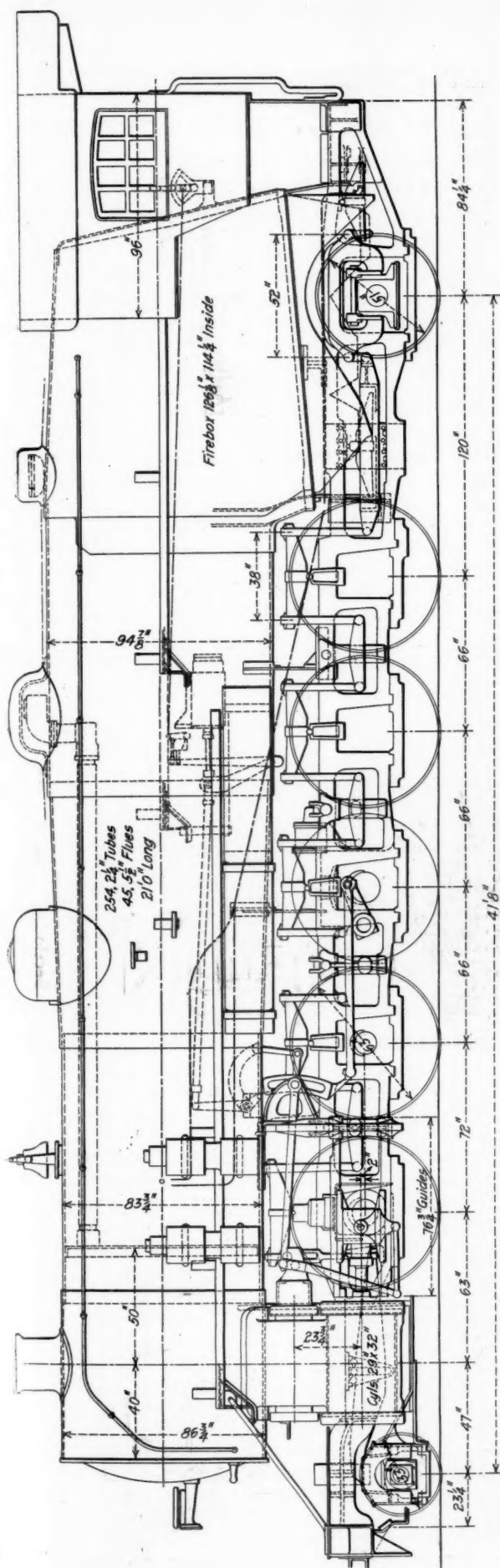
The 2-10-2 type locomotives are used in slow freight service between Manchester, N. Y., and Sayre, Pa., a distance of 88

miles. That in the 2-10-2 is 60 in. long, and that in the Pacific type is 48 in. long.

The boilers for both the Pacific and the 2-10-2 type locomotives have a conical ring in the middle course, which increases the outside diameter from 83¾ in. to 94⅞ in. The seam of the smokebox ring is welded along the top center line of the boiler. The first ring has a diamond longitudinal seam on the left side center, the conical ring has a diamond longitudinal seam at the top center and the last course has a longitudinal seam on the left side just under the dome flange. The thickness of the first ring is ¾ in. and of the second and third rings 13/16 in. The front tube sheet is 5/8 in. thick and the back tube sheet ½ in. thick. A dash



Elevation and Sections of Pacific Type Locomotive for the Lehigh Valley



Elevation of 2-10-2 Type Locomotive for the Lehigh Valley

plate, which also supports the steam pipe, is located in the middle course of the boiler. It is 12 in. wide by $\frac{1}{2}$ in. thick.

One of the interesting points in the construction of both types of these locomotives is the fact that all the seams in the firebox, including those in the combustion chamber, are welded. The side and crown sheets are in one piece, being $\frac{3}{8}$ in. thick. The door sheet is $\frac{3}{8}$ in. thick. Tate flexible staybolts are used extensively throughout the firebox in both locomotives. In the Pacific type locomotives there are 48 $1\frac{1}{8}$ -in. Tate expansion stays, 420 rigid $1\frac{1}{8}$ -in. radial stays, 1,534 1-in. Tate flexible staybolts and 537 1-in. rigid staybolts. In the 2-10-2 type locomotives there are 56 $1\frac{1}{8}$ -in. Tate expansion stays, 546 $1\frac{1}{8}$ -in. rigid radial stays, 1,820 1-in. Tate flexible staybolts and 491 1-in. rigid staybolts. In the Pacific type locomotives all the stays in the combustion chamber below and including row V, are flexible, as are the first four rows of the crown stays. All the staybolts in the sides are flexible up to and including row B. All the staybolts in the throat are flexible. Superheaters, brick arches and Street mechanical stokers are used in both types of locomotives. The firedoor opening is 14 in. by 26 in., and is welded the same as the other seams in the firebox, and they are equipped with pneumatically operated firedoors.

The reciprocating parts are made of special steel to reduce their weights. The piston heads are made of rolled steel of light section, being 1 in. thick at the piston rod hub and $1\frac{1}{16}$ in. thick at the outside of the web. Hunt-Spiller bull rings are held in place on the piston head by a retaining ring which is welded to the piston head. The packing rings are also of Hunt-Spiller metal. Hollow extended piston rods of Nikrome steel are used. The crank-pins, connecting rods and stub straps are also made of Nikrome steel.

The cylinders are bushed, and are designed with outside steam pipe connections, and with exhaust passages of liberal cross sectional area, free from abrupt bends. The steam chests are fitted with vacuum relief valves. When drifting, saturated steam may be admitted to the cylinders through a small pipe which leads from a shut-off valve tapped into the steam turret. This pipe is provided with a line valve conveniently placed in the cab.

The Walschaert valve gear is used on 20 of the Pacific locomotives and the Baker valve gear is used on the remaining ten. The Ragonnet power reverse mechanism is applied. The valves are set with a travel of 6 in. and a lead of $\frac{5}{16}$ in. The steam lap is $1\frac{3}{16}$ in., and the exhaust clearance is $\frac{1}{8}$ in. Thirty of the 2-10-2 locomotives are fitted with the Walschaert valve gear, while the remaining ten have the Baker valve gear. The piston valves interchange with those of the Pacific type locomotives, and the valve setting is the same, except that in the 2-10-2 locomotives the exhaust clearance is reduced from $\frac{1}{8}$ in. to $\frac{1}{32}$ in. The advantages of using the Ragonnet power reverse mechanism are especially apparent on a locomotive such as this, where, on account of the unusually wide firebox, the room available in the cab is limited. It has been the practice, on all road engines recently built for the Lehigh Valley, to place the cab at the rear, regardless of the width of the firebox.

The Economy front truck is used in the 2-10-2 design, in combination with the Economy lateral motion front driving-box. The rear truck is of the Rushton type, with inside journals. This design of truck has been applied to all the Baldwin Mikado type locomotives built for the Lehigh Valley. The reciprocating parts are similar in design to those of the Pacific type locomotives, and the cross-heads are duplicates, with the exception of the cross-head pins, which are larger on the 2-10-2 locomotives.

In addition to these locomotives, 20 Pacifics, and 36 of the 2-10-2 type locomotives have been ordered for delivery in

the fall of the present year. The following is a list of the general dimensions and ratios for both types of locomotives:

General Data		
Type	4-6-2	2-10-2
Gage	4 ft. 8½ in.	4 ft. 8½ in.
Service	Fast freight and heavy passenger	Freight
Fuel	Soft coal	Hard and soft coal mixed
Tractive effort	48,700 lb.	72,800 lb.
Weight in working order	301,500 lb.	370,000 lb.
Weight on drivers	197,200 lb.	289,000 lb.
Weight on leading truck	51,000 lb.	29,000 lb.
Weight on trailing truck	53,300 lb.	52,000 lb.
Weight of engine and tender in working order	458,700 lb.	540,000 lb.
Wheel base, driving	13 ft. 8 in.	22 ft. 6 in.
Wheel base, total	36 ft. 1 in.	41 ft. 8 in.
Wheel base, engine and tender	68 ft. 10½ in.	74 ft. 6 in.
Ratios		
Weight on drivers ÷ tractive effort	3.9	4.0
Total weight ÷ tractive effort	6.2	5.1
Tractive effort × diam. drivers ÷ equivalent heating surface*	639.2	685.0
Equivalent heating surface* ÷ grate area	74.3	66.9
Firebox heating surface ÷ equivalent heating surface, per cent.	6.6	6.6
Weight on drivers ÷ equivalent heating surface*	34.5	43.2
Total weight ÷ equivalent heating surface*	54.1	55.3
Volume both cylinders	18.6 cu. ft.	24.5 cu. ft.
Equivalent heating surface* ÷ vol. cylinders	300.6	273.
Grate area ÷ vol. cylinders	4.0	4.1
Cylinders		
Kind	Simple	Simple
Diameter and stroke	27 in. by 28 in.	29 in. by 32 in.
Valves		
Kind	Piston	Piston
Diameter	14 in.	14 in.
Greatest travel	6 in.	6 in.

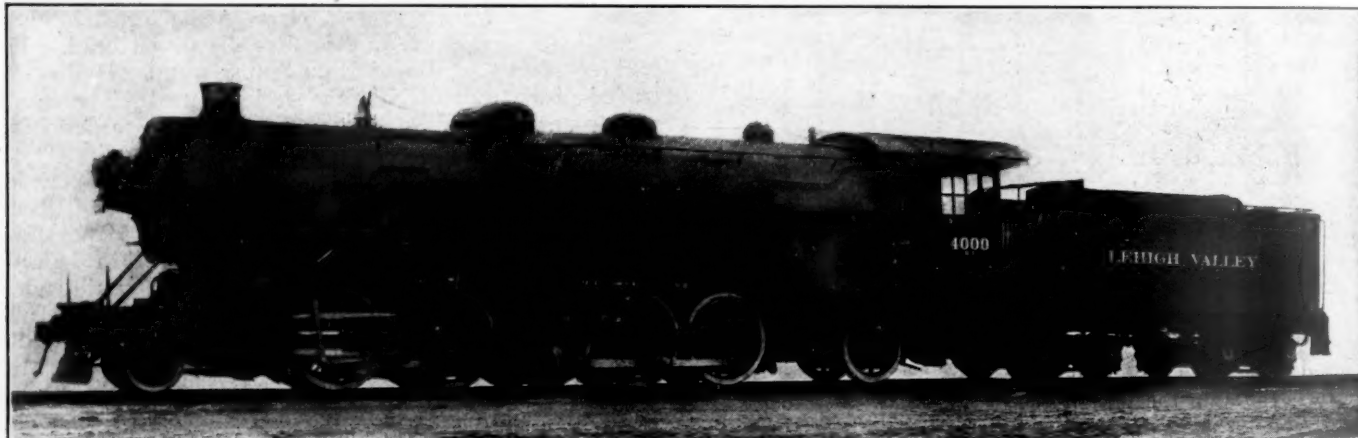
Wheels, diameter	36 in.	36 in.
Journals, diameter and length	5½ in. by 10 in.	6 in. by 11 in.
Water capacity	8,000 gal.	9,000 gal.
Coal capacity	12½ tons	15 tons

* Equivalent heating surface = total evaporative heating surface ÷ 1.5 times the superheating surface.

REDUCING BREAKS-IN-TWO ON THE SANTA FE

In discussing the handling of trains before the Car Foremen's Association of Chicago, H. R. Lake, trainmaster of the Santa Fe at Emporia, Kansas, told of the measures which have been taken to reduce the number of breaks-in-two on the eastern division. Each month a circular is issued showing the number of breaks-in-two for the preceding month, with a comparison with the figures for the last six months and the general average for the year. In another tabulation is shown the breaks-in-two charged to each engineman for the preceding two months following which is the record of each engineman for the year past. The breaks-in-two are classified between freight and passenger trains and also as to whether they occurred while starting, stopping or running. The percentage of the trains operated on which breaks-in-two occurred and the percentage of the totals for which each individual engineman was responsible are given. A further classification according to the cause as ascertained by investigation shows in detail the causes which contributed to the parting of trains.

The analysis of the breaks-in-two for the year 1916 showed that of the total number 45.5 per cent occurred while



Santa Fe Type Locomotive for the Lehigh Valley

Steam lap	1½ in.	1½ in.
Exhaust clearance	¾ in.	1-32 in.
Lead in full gear	¾ in.	¾ in.
Wheels		
Driving, diameter over tires	73 in.	63 in.
Driving, thickness of tires	3½ in.	3½ in.
Driving journals, main diameter and length	13 in. by 20 in.	13 in. by 20 in.
Driving journals, front, diameter and length	11 in. by 20 in.	11 in. by 20 in.
Driving journals, others, diameter and length	11 in. by 14 in.	11 in. by 14 in.
Engine truck wheels, diameter	33 in.	33 in.
Engine truck, journals	7 in. by 12 in.	7 in. by 12 in.
Trailing truck wheels, diameter	51 in.	51 in.
Trailing truck, journals	9 in. by 14 in.	9 in. by 14 in.
Boiler		
Style	Conical	Wagon-top
Working pressure	205 lb. per sq. in.	200 lb.
Outside diameter of first ring	83¾ in.	83¾ in.
Firebox, length and width	120½ in. by 90 in.	126½ in. by 114¼ in.
Firebox plates, thickness—crown, sides and back	¾ in.	¾ in.
Tube sheets	½ in.	½ in.
Tubes, number and outside diameter	254, 2¼ in.	254, 2¼ in.
Flues, number and outside diameter	45, 5½ in.	45, 5½ in.
Tubes and flues, length	17 ft. 6 in.	21 ft.
Heating surface, tubes and flues	3,734 sq. ft.	4,485 sq. ft.
Heating surface, firebox	369 sq. ft.	438 sq. ft.
Heating surface, total	4,103 sq. ft.	4,923 sq. ft.
Superheater heating surface	980 sq. ft.	1,179 sq. ft.
Equivalent heating surface*	5,573 sq. ft.	6,691.5 sq. ft.
Grate area	75 sq. ft.	100 sq. ft.
Tender		
Tank	Water bottom	Water bottom
Weight	157,200 lb.	170,000 lb.

trains were stopping, 24.5 per cent while trains were starting, 27.2 per cent while running and 2.8 per cent while switching.

The contributing causes in detail were as follows:

Draft gear:	
Drawbar pulled out	22.8 per cent
Drawbar broken	11.6 per cent
Draft timbers pulled out	8.8 per cent
Sleeve bolts broken	5.1 per cent
Defective draft bolts and timbers, broken tail pins, broken continuous rod	5.0 per cent
Total	53.3 per cent
Couplers and uncoupling devices:	
Knuckle broken or defective	12.3 per cent
Defective couplers and drawbars	5.1 per cent
Knuckle opened	5.1 per cent
Knuckle worn	4.4 per cent
Defective lock block	4.0 per cent
Lift lever raised, lift rod key broken or defective, short uncoupling chain	2.7 per cent
Total	33.6 per cent
Air brake:	
Burst air hose	6.2 per cent
Air set from rear, defective triples and train lines	3.3 per cent
Total	9.5 per cent
Miscellaneous:	
Carrier irons down, low drawbars, cars buckled, etc.	3.6 per cent

On account of the circulars on breaks-in-two marked reduction in the number has been effected.

Operation of British Railways in the War

Passenger Rates Increased 50 Per Cent, Service Reduced, Freight Cars Pooled, and Economies Adopted

By Julius H. Parmelee.

FOUR important changes were inaugurated on the railway system of the United Kingdom on or about the first of January, 1917, all of which have a distinct bearing on the conduct of the war and a possible bearing on the war problems of the railways in the United States.

In the first place, severe economies and restrictions were instituted by the Railway Executive Committee, additional to those already in effect. Second, the Irish railways entered the scheme of government control. Third, passenger rates jumped 50 per cent. Fourth, railway freight cars were grouped under a general pooling arrangement.

ECONOMIES AND RESTRICTIONS

War enlistments have depleted the forces of British railway employees to such an extent that many operating economies had been introduced prior to 1917. By agreement with the government Board of Trade, the British railway reports had been cut to bare skeletons of their normal form. Nearly all traffic statistics had disappeared, together with a large part of the income account. Even in its emasculated form, many railways had discontinued sending copies of their annual report to their stockholders, except on special request. Traffic divisions had been abolished. The Railway Clearing House, co-operatively maintained by the roads, had greatly reduced its work and the number of its employees. In 1915 the railways agreed to honor each other's "Paid" and "To pay" stamps and labels on express traffic, thus obviating a large amount of work in the apportionment of charges between two or more companies participating in a shipment. It had even been proposed to require all express matter to be prepaid, obviating still further bookkeeping, also to set a maximum limit to the weight of express packages. Again, the British railways had instituted economies with respect to passenger baggage. Many railways before the war permitted passengers to forward free of charge baggage in excess of the weight allowed by law. Early in the war the Railway Executive Committee requested all passengers to reduce their personal baggage to a minimum. This would reduce the aggregate amount of baggage hauled, and would also release baggage men for other service. In some cases baggage men could be replaced with women.

Beginning January 1, even more severe economies and restrictions were made effective. Many passenger trains were taken off, especially at night and on Sundays, in order to expedite the movement of freight, to save coal, and to release railway employees for service in lines more definitely related to the prosecution of the war. Many way-stations have been closed so as to reduce the station forces, and also to obviate the necessity of many stops. Branch lines have in a few cases been temporarily abandoned. Passenger baggage has been definitely limited to 100 pounds, restaurant and sleeping cars have been reduced in number or taken entirely out of service.

In all, several hundred daily passenger trains were withdrawn from service on New Year's Day. Among these were a number of fast expresses, non-stop specials, and the like, with the result that the average speed of passenger traffic has been reduced. This reduction of speed has a double benefit: it reduces expenses in greater ratio than the reduction in trains, and clears the tracks for the all-important freight traffic. Long-distance non-stop traffic has reached a high state of development in Great Britain, and the severe reduc-

tion of this class of passenger service indicates the thoroughness with which the railway service is being pruned.

IRISH RAILWAYS

Irish railway systems were taken under the government scheme by an order of December 17, 1916. The original agreement of August 5, 1914, had applied only to the English, Scotch and Welsh railway systems. Employees of the Irish railways had become more and more restive as the war progressed and although they received various wage concessions from their employers, the fall of 1916 found them making renewed demands. As a matter of fact, their war bonuses of two to four shillings a week did not at all compare with the ten-shilling bonus the British railway employees had been granted by the government. On the eve of a threatened strike on the largest Irish railway, the Board of Trade seized the bull by the horns and assumed control of the Irish railway situation. Irish railways operate about 3,500 miles of line as compared with more than 20,000 miles in Great Britain.

Like the British railways, the Irish railway system has been placed under the management and control of a Railway Executive Committee, composed of the Under-Secretary for Ireland as nominal chairman and the general managers of four Irish roads. One of these general managers is the acting or working chairman. The policy of this committee has already been exhibited in the restriction of passenger train service, increases in passenger fares (accomplished probably by the abolition of reduced and special rates), and the like.

Although no details have been announced, it seems likely that the financial agreement of the government with the Irish railways will be similar to that with the British roads; i. e., that the government will guarantee to maintain the net revenue of the Irish roads at the same level as that of 1913, the last normal year before the war.

INCREASES OF PASSENGER RATES

Effective January 1, 1917, the Railway Executive Committee increased passenger fare schedules 50 per cent. This change affected every form of travel except commutation and workmen's tickets and special contract, zone and shippers' rates. To arrive at an idea regarding the real meaning of such an increase as this, it may be recalled that British passenger fares per mile are on a penny (two cents) basis for third class, while the maximum for second class and first class are respectively two and three pence. The 50 per cent increase raises these rates from two to three cents for third class. Nine-tenths of the passenger traffic in England goes at third-class rates, which now takes the three-cent rate. Coupled with the virtual abolition of all special excursion rates already effected prior to 1917, the cost of personal travel in England is considerable.

The object of this radical increase in passenger rates was frankly stated to be reduction in travel rather than increase in railway revenue. The Railway Executive Committee had already attempted various measures to reduce travel, but without complete success. With pockets full of "war bonuses," the people have taken to train travel, in spite of all restrictions and dangers. To increase passenger fares was considered a simple and automatic method of shutting off nearly all but necessary travel.

That this method had its disadvantages and its injustices is admitted by the government. A representative of the Board

of Trade explained to the House of Commons on March 8 that the new rates and restrictions had given rise to much irritation and considerable inconvenience. He stated that the purpose of the advanced fares was to restrict traveling, and that although the increases did work hardship on such classes as commercial travelers, no alternative method occurred to him that was both simple and effective.

The increased rates apply to all steam railways, and to certain suburban sections of the London metropolitan system. One effect of the increase has been the curtailment of the suburban traffic of many railways, the closing of many suburban stations in London and other large cities, and a considerable increase in the traffic of the street railway systems of those cities. Although commutation tickets were exempted from the increase, yet much of the suburban traffic fell into the zones in which the increases were effective.

The government has intimated that if the restrictions on travel and the increase in rates do not effect the desired reduction in passenger traffic, more drastic restrictions will be put into force. Just what the result has been since January 1 is not wholly clear, although the London Times estimates that ordinary passenger travel has fallen off 20 per cent. On this basis it would appear that there have been both a reduction in travel and an increase in passenger revenue, the benefit of the latter going, of course, to the government and not to the roads.

Freight rates in Great Britain do not seem to have been greatly disturbed since the opening of war. This means nothing, however, since the agreement of the government with the railways (as is explained below) has practically abolished freight rate schedules. It will be recalled in this connection that merchandise freight rates had been advanced about 4 per cent by the British railways on July 1, 1913, in consequence of the wage increases which had been necessitated by threat of a general strike. This rate advance was held up for some months in the courts and did not actually take effect on some roads until 1914, that is, until very near the outbreak of the war. The Irish railways, however, recently increased merchandise rates on through traffic between Ireland and England and Wales. The reason of the increase was given as rising costs. Although the Irish railways are now under government control, this does not seem to have altered the plan to increase Irish rates, which became effective, as planned, on February 1, 1917.

POOLING OF FREIGHT CARS

On January 2, 1917, the Railway Executive Committee practically placed all open freight and coal cars owned by railways into one great car pool, or rather into twelve regional pools operating under the committee. The details by which this pool operates are too complicated to enumerate here, but the important thing is that a considerable amount of empty car mileage is obviated. Only a few classes of cars are excepted from the pool.

Traffic is so heavy under war conditions that many difficulties have occurred respecting the supply of cars. The Railway Executive Committee had already appealed to large shippers to economize both time and space in the use of cars; to load and unload with all possible despatch, so as to release cars for service within the shortest time, and to refrain from loading a car until it had been definitely ascertained that the consignee could accept immediate delivery. Not to adhere to this appeal, it was stated, would be "a serious loss to the country, and in a sense playing into the hands of the enemy."

Appeals of this sort had not brought satisfactory results, and the next step was the pool of railway freight cars. There still remain outside the pool the very large number of privately owned cars, the majority of which are those of collieries. The total number of these private freight cars has been estimated at from 600,000 to 700,000, and the waste and expense of hauling these cars light back to their owners after each trip

has been recognized and pointed out in many ways before and since the war. It seems almost beyond question, therefore, that the Railway Executive Committee will ultimately place shippers' cars in the same pool, or the same kind of pool, as railway owned cars.

The various actions outlined above were taken under authority of an Order in Council of December 13, 1916, which empowered the Board of Trade to

(a) Take possession of any private owners' wagons and use them in such manner as they think best in the interests of the country;

(b) To enforce the prompt loading or unloading of wagons;

(c) To curtail any statutory requirements as to the running of trains or the affording of other facilities;

(d) To restrict or prohibit certain classes of traffic, including the carriage of baggage;

(e) To modify any statutory requirements with respect to the maximum amount of passenger fares.

BRITISH RAILWAYS AFTER THE WAR

Discussion of the future of British railways after the war goes merrily on in the United Kingdom, despite the tremendous pressure of current war topics. If anything, the question has received more earnest discussion recently than during 1915 or 1916. In brief, all English commentators are agreed that the relation between the railways and the state will be closer than ever before. Another point of almost unanimous agreement is that operating expenses will never again be as low as before the war, even if they fall somewhat after the stress of war conditions has passed. Although the view is not universal, it is quite commonly urged that there must be a general advance in rate levels. Thus far during the war, the government has borne the increasing cost of railway wages and supplies; after the war agreement has been terminated, however, the burden will be thrown directly on the railways, who must have recourse to higher rates for reimbursement. As the Railway Gazette (London) remarks, such an increase in rates will be resented by the shippers, yet it is the very way by which they themselves would meet increased working expenses.

Significantly enough, the railway rate problem is acute also in France. Wages and the prices of coal and other materials have gone up greatly, exactly as has been the case in the United Kingdom, so much so that the six great French systems in 1916 showed a deficit estimated at \$30,000,000. A new law designed to compensate railway employees for the increased cost of living will add \$16,000,000 a year to operating expenses. Railway students and the French press are quite generally advocating an all-round increase in rates. The Temps of Paris, for example, remarks that such an increase is a form of taxation, "a just tax, since it is difficult to understand why, when the cost of everything has risen so largely, the purveyors of transportation, who are obliged to pay more for their labor and materials, should be forbidden from increasing like every other commercial man, the price of their commodity, namely, transportation."

RESULTS OF AGREEMENT WITH THE GOVERNMENT

Under its war agreement with the railways, the British government has guaranteed to each company the same net revenue that it earned in 1913, the last normal year before the war. Under this arrangement, each company carries all government traffic on warrant, receiving no money directly for the service. Furthermore, each company keeps all receipts from passenger and freight traffic, whether local or through, and there are no interline settlements. This simplifies railway accounts, and the result is the same in the end as though elaborate book-keeping methods had been in vogue. Thus a line that originates much traffic may receive during the year more than enough to cover its operating expenses and net revenue: in

such a case the excess is handed to the government treasury, which in turn reimburses any road or roads that have not been so fortunately placed.

As to the actual results of the agreement, little is known. During the first five months of the war, from August 1 to December 31, 1914, it is probable that the government met a large deficit in railway revenues. During the calendar year 1915 the British railways handled not only a tremendous military traffic, but also a very general increase in ordinary passenger and freight traffic. The passenger travel was at ordinary rates, virtually all of the cheap excursion and other reduced rates having been temporarily abolished. It has been estimated that in 1915 the railways actually received from their general traffic enough returns to cover their operating expenses and guaranteed net revenue. This seems almost unbelievable; if true, it means that the enormous military traffic must have been carried for nothing, and that it represented a gift from the railways to the government.

In 1916 conditions were somewhat different. Owing to pressure from railway labor, the government had twice been forced to make horizontal increases in the weekly wages of railway employees. The first time the increase was five shillings per week for the great majority of the employed force, of which three-fourths was borne by the government and only one-fourth by the railways themselves. Again, in September, 1916, a second advance of five shillings a week was made, the whole increase in this case being chargeable to the government. These two increases represent an annual increase in railway wages in Great Britain of approximately \$60,000,000. It is probable, therefore, that the government treasury during 1916 was obliged to meet a considerable deficit on the part of the railways and that this condition will continue until the end of the war.

It should not be overlooked that while the agreement of the government with the railways appears fair to all the roads, yet it may work injustice as between individual companies. For example, a road handling a million tons and earning a net revenue of \$100,000 before the war, may now be carrying several times the pre-war traffic and yet be forced to be content with the same net revenue. Another road might be so placed as to be doing less than its normal business, and yet be receiving its normal net revenue.

At the outset of the war, the government allowed nothing to the railways to cover increased interest payments on account of new investment since the war began. The injustice of such an omission has become apparent, however, and the government has recently agreed to provide for the payment of interest at 4 per cent on all new capital invested by the railways since August 4, 1914, on new lines or branches, terminals, equipment or other facilities put into use since January 1, 1913. By "new" is meant additional investment over and above ordinary renewals and replacements.

Another adjustment has related to maintenance expenses. Under the stress of war service, the railways have not kept road and equipment up to the normal maintenance level. The government has taken cognizance of this situation, and is allowing the roads to make maintenance charges in their expense accounts, regardless of whether the maintenance is actually carried out or is deferred. As a result, many railways have accumulated considerable reserves for future work of this kind. As one English journal quaintly puts it, they are "full of funds," which they are investing to a large extent in war loans.

That the service of the British railways to the nation at war has been well nigh incalculable is fully recognized. Lord Kitchener, former Premier Asquith, and many others high in the British war councils have publicly expressed the deep obligation of the empire to the railway system for its services.

These services have assumed a number of forms. Not only have the railways handled the ordinary traffic of Great Britain, which itself has been heavier than usual, but in addi-

tion they have transported millions of troops and untold amounts of munitions and supplies with a high degree of efficiency. At the same time railway employees in large numbers have enlisted under the colors. By the end of 1916 nearly 150,000 men had been released by the railways for war duty; this was about 25 per cent of the normal force of employees, and 50 per cent of the men of military age. Again, the British railways have supplied many of their trained employees to assist in the construction and operation of railways laid down in the military zone in France. They have also supplied skilled men to munitions factories, and have served the state in a thousand other ways. The balance sheet between the British public and its railways is still open, and only the future will show on which side of the ledger the railways stand. It seems morally certain, however, that the balance will not be a debit item.

RAILWAY WATER SUPPLY*

By C. R. Knowles

Superintendent of Water Service, Illinois Central, Chicago, Illinois.

An analysis of the use of 4,550,000,000 gal. of water per year on 2,000 miles of railroad indicated that locomotives consumed 3,367,000,000 gal., or 74 per cent; washing and filling boilers at terminals required 728,000,000 gal., or 16 per cent; stationary power plants used 250,250,000 gal., or 5½ per cent, and 204,750,000 gal., or 4½ per cent was used for sanitary and domestic purposes at shops, offices and miscellaneous buildings. The above figures are not given as a typical case; it is hard to arrive at average figures that can be applied to all roads, as such figures must be based on the facilities involved.

The importance of the water service is founded not only on the cost of the initial investment, but on the fact that it forms a permanent item in the cost of operation, and if economy is to be gained the operating expense must be considered rather than first cost. On the other hand, extravagant outlay does not always mean economical operation.

The development of transportation by rail has made it necessary to provide improved facilities in every branch of railway operation. While water supply is among the most important of these requirements it has perhaps received less consideration than almost any other department, many railroads being apparently indifferent to the necessity for more economical and serviceable installations. While many of the water stations constructed 20 years or more ago are still in use, the expense for maintenance and operation is often excessive and an adequate supply uncertain. With freight trains on important trunk lines of low gradients loaded with 2,000 to 5,000 tons, and with engine and tender storage of 8,000 and 10,000 gal., the development of a water supply may certainly be classed among the most important features of modern railway operation. Not alone is the demand for an increased supply, but the higher pressure carried and the importance of maintaining fast passenger and freight schedules, together with the loss of time through keeping locomotives out of service for washing and repairs on account of bad water has created a demand for water of a better quality than that provided in former years.

No figures are available as to the sources of water supply of American railroads, but the following statistics concerning municipal supplies are given by the United States Geological Survey: "In nearly 400 cities located in all parts of the United States and southern Canada, 40 per cent of the public water supplies are drawn from wells; 25 per cent from lakes, ponds or springs; 24 per cent from rivers and 11 per cent from mountain streams, impounded or otherwise. The total

* Abstracted from a paper presented before the New York Railroad Club on April 20, 1917.

volume of water taken from other sources is, of course, greatly in excess of that taken from wells." While municipal water supplies are used for domestic purposes, rather than for boiler supply, their various sources may be taken as a fair average of the sources of water used for railway purposes, for the reason that the railroads are compelled to look to the same places as the municipalities through which they operate, in many instances purchasing their supply from cities and towns along their lines.

The general tendency of railroads has been to attempt to standardize the pumping equipment along with other common standards, it being assumed in many instances that if certain equipment gave good results under certain conditions that it should be adopted as standard and used in all cases, regardless of local conditions. While it is desirable to adopt certain standards as applying to water supply, such as tanks, pump houses, etc., it is a mistake to include the pumping equipment in such standardization, except where such equipment will not be materially affected by varying conditions so often found in establishing a pumping station.

The life of a properly constructed pipe line will probably be several times that of the pumping equipment and the consumption materially increased before it has served its usefulness, accordingly the importance of providing for future growth as well as present requirements should not be overlooked. Too much stress cannot be placed upon the maintenance of pipe lines. We are inclined to overlook this feature for the reason that they are for the most part underground, but if they were brought to the surface and their true condition realized it would doubtless prove an instructive but very unpleasant surprise.

Up to within the past few years standard tanks rarely exceeded a capacity of 50,000 to 60,000 gal., while the tanks on many lines today include some holding 100,000 to 150,000 gal., and even 200,000 gal. While the tendency toward larger tanks has been marked, the development along this line has been all too slow and the efficiency of the water service is impaired to a great extent by limited storage. Particularly is this true at terminals where a large number of engines take water within a short time, and at roadside stations where the capacity will not carry over without the employment of night pumpers, thus materially increasing the cost of the water. It is not economy to erect a tank good for a life of thirty or forty years, and then find within a few years that it is too small to supply the demand without continuous pumping.

Fuel costs form one of the heaviest expenses in connection with the operation of water stations, and the field for economies in this direction is a large one. These economies may be effected in many ways. More efficient pumping equipment, properly designed boilers and feed water heaters all play a part in the economical operation of steam plants, while internal combustion engines designed to operate on low-priced oils, carburetors designed to permit of use of distillate instead of gasoline, will reduce fuel costs where internal combustion engines are used.

An idea of what may be accomplished along this line is given by comparing the fuel costs of the Illinois Central for the fiscal years 1915 and 1916. During 1915 27,734 tons of screenings and 23,846 tons of lump and mixed coal was used at a total cost of \$51,998, while in 1916, notwithstanding an increase of 998,681,837 ton miles and 4,138,894 passenger miles, the consumption of screenings was 29,276 tons and of lump and mixed coal 10,892 tons, at a cost of \$41,374, a decrease for the year of \$10,624. During the same period the consumption of gasoline was decreased 15,434 gal., showing a net saving in the cost of fuel for internal combustion engines of \$2,073.59.

With the exception of a few of the larger railroad systems, no distinct water departments are maintained. On the majority of roads the development of water supply and design

and construction of water stations is handled by some one in the engineering department in connection with other duties, while the maintenance and operation comes under the supervisor or foreman of bridges and buildings, whose principal duties are along other lines. In fact, providing water for locomotives and other railway purposes is a feature of railway operation that varies more widely than any other department on the railroad.

The many different methods of handling water supply on railroads may be accounted for in the fact that only a few years ago this department of the railroad was not considered of any great importance, as the quantity of water required was not great and the quality was a matter that was given but little consideration. Conditions have changed with modern railway operation, and the water requirements on the railroads of today call for water service of the highest order.

The investments necessary to provide improved facilities, together with the cost of pumping and properly treating the large quantities of water required, represents such heavy expenditures that more careful and extensive investigation should be given the subject of water supply with a view of greater economy and more satisfactory service. To accomplish the desired results a well organized water department is necessary. The organization of such a department does not necessarily mean a heavy additional expense for salaries, etc., but rather the reconstruction of the existing organization, placing the forces used in water service on a definite basis with a supervising head directing the energies of the department in the proper channels. In fact, reorganizing the water service forces as a distinct unit would on many roads effect an actual reduction of force.

A water department organization does not always mean that the division of local forces are materially changed where water service men are locally employed and the nucleus of an organization exists, but rather that the local officers and the engineering department are relieved of the duties incidental to the design and development of water facilities, and the work placed in the hands of those trained along this particular line. That there is an urgent necessity for such an organization has been proved by the results obtained by the roads which have established a department to handle this important feature of railroad operation.

REDUCING COAL TRAFFIC.—It is a very wise action on the part of Mr. Guy Calthrop, in his position of Controller of Coal Mines, issuing a circular to coal owners, factors and merchants, suggesting that they should not make forward contracts for longer periods than three months. In view of the demands upon the railways it is obvious that it is necessary to limit the scope of future commitments, as at any time restrictions on transit may be made. —*Railway Gazette, London.*

ZEPPELINS NOW HAVE LESS FEARS FOR ENGLAND.—Not only the travelling public but most railway officers will be glad to know that the regulations as to passengers lowering the blinds after dark have been withdrawn. These regulations have not had the same unfortunate effects as those in reference to the reduced lighting, but they have contributed to accidents through passengers alighting when the train stopped outside a station, or from alighting on the wrong side. They have, further, caused many passenger to be over- and under-carried and led to overtime at stations. However, they are now a thing of the past, as on March 22 the Home Secretary, under Regulation 11 of the Defence of the Realm Regulations, revoked the previous instructions. It has now been arranged that in all railway carriages shall appear a notice to the effect that the order as to lowering the blinds is cancelled, and adding that the lights in the carriages will be extinguished in cases of necessity. —*Railway Gazette, London.*

E. J. PEARSON SUCCEEDS HOWARD ELLIOTT ON THE NEW HAVEN

Edward J. Pearson, vice-president of the New York, New Haven & Hartford since March 9, 1916, has been elected president of the company, succeeding Howard Elliott. A statement given out by Mr. Elliott follows:

"With much regret I have come to the conclusion that it is for the best interest of my family and myself to relieve myself of the work incident to the executive management of the New Haven Road and its associated properties. I considered taking this step a year ago, but felt that the work of re-organizing the staff of the company had not gone far enough to justify me in retiring. Nearly four years ago the directors of the company asked me to come to New England and help adjust a very complicated transportation situation. I wanted to take up the work because it involved interesting railroad and economic problems; because I am a believer in New England and its future, and because of personal interests in New England.

"The actual conditions surrounding the New Haven and the obstacles to its progress that developed shortly after I came were unusual, unexpected and unforeseen. The attitude of the Federal Government, resulting in a complete dissolution of the New Haven system; the declaring illegal by the Massachusetts Courts of a plan which guaranteed \$67,500,000 in cash to pay floating debts and make needed improvements; the numerous investigations of the company's affairs; the very serious business depression beginning early in 1914 and lasting until the summer of 1915; the European war and the disturbed industrial conditions, all combined to complicate the work to be done, and to delay obtaining the results desired in the interest of the public, security-holders and the employees. Then, too, public opinion was excited and adverse to the company. "The directors, officers and the employees, and the bankers, who have helped to carry the floating debts, have all worked diligently and much has been accomplished in adjusting the affairs of the company, and laying a foundation upon which to build.

After nearly a year of negotiation with the Department of Justice an agreement was made in 1914 which took from the control of the company a very large amount of its property. This agreement with the government was entered into by the company to save it, and changed the entire situation. The failure of the plan to issue \$67,500,000 convertible debentures left the company confronted with a floating debt of nearly \$50,000,000 and no means of meeting it except by short-term notes. The floating debt at one time was nearly \$56,000,000 but it has been reduced in the last three years to \$43,000,000 and notes have just been sold for \$45,000,000 to care for that indebtedness and leave \$2,000,000 for improvements.

"Earnest efforts have been continuous for several years

to have the laws affecting the company in Massachusetts, Connecticut and Rhode Island made harmonious, and there is a good chance of success this spring. Such legislation should permit the adoption of a plan for caring for the floating debt which hangs like a millstone about the neck of the company.

"How serious the depression of business and the demoralized condition of the affairs of the company were in 1914 is evidenced by the fact that for the year ending June 30, 1914, the company had only \$268,000 left after paying expenses, taxes and fixed charges. For the three calendar years ending December 31, 1914, 1915 and 1916, the balance above fixed charges was:

1914.....	\$182,960.36
1915.....	4,659,139.76
1916.....	5,554,977.36

"The various departments have been re-organized and strengthened, and new methods have been and are being introduced. Some of the important problems of the company now are:

"(1.) To adopt a plan for handling its floating debt, and for obtaining new capital for improvements. In considering this the stockholders should realize that they are the owners of the property and ought to come to its rescue by furnishing some new capital and not rely indefinitely upon banks and bankers for temporary loans which create a very uncertain and dangerous situation.

"(2.) To dispose of the so-called 'Outside properties' (which must be sold under the Federal decree) at a minimum loss, and use that money for improvements or paying debts.

"(3.) To obtain rates—freight, passenger, mail and express—that will enable the company to meet the steadily increasing wages and the increasing prices of materials, and the serious conditions imposed by the war.

"(4.) To perfect every detail of management of the organization and of the property

so as to save the maximum amount of money.

"(5.) To spend from earnings or from new capital enough money in the next five years to modernize the plant and make it adequate to the needs of New England—to provide better working conditions resulting in substantial economies, in the hope of paying a return to the shareholders.

"The property is a wonderful one and its success now depends very largely upon the willingness of the stockholders to help pay its debts and of the public to pay rates sufficient to meet the rising expenses and have enough left with which to make improvements and to improve the credit of the company; also, upon the conditions that will result from the entrance of the United States into the world war. The burdens on this country because of this war are not yet realized to the extent that they should be. Everyone will have to help—there must be self-denial—much inconvenience and probably some suffering. The transportation systems of the country will without doubt have to give less service along some lines so as to conserve fuel, equipment



E. J. Pearson

and men for war purposes, and doubtless travellers and ship-pers will be willing to accept the situation.

"The property is in better condition to-day than for several years past, and a comprehensive plan of improvements has been made and much of the work is going on. \$18,258,000 has been spent for equipment, additions and improvements and the protection of subordinate properties since June 30, 1914. The operating results of the New Haven and Central New England roads, which are managed as one property, compare for the years ending December 31, 1913 and 1916, as follows:

	1913	1916
Operating Revenue	\$72,356,585.62	\$85,640,365.10
Operating Income	16,715,056.00	25,125,268.54
Ratio of Operating Expenses to Operating In- come—Per Cent.....	71.78	66.92

"In 1916 a greater volume of business could have been handled if the facilities of the company had been better in the matter of tracks, terminals and powerful locomotives, and if the facilities of the receivers of freight had been such that loading and unloading of cars could have been made without delay. The results for the three months ending March 31, 1917, show an increase in gross revenues of \$1,625,000 and in net of about \$1,000,000. Gross revenues for April are showing good increases. Increases in net cannot be continued unless substantial increases in rates are permitted, because the company is beginning to feel the effect of the increased wages and prices of material, which effect will be cumulative and amount to large sums.

"Public opinion is much more favorable to the company than four years ago, and the relations of the company to the state and Federal governments are harmonious and co-operative.

"Feeling the need of an occupation that will permit me a little more time for my family and myself, and the necessity of less severe work after nearly 37 years of almost continuous service, I have asked to be relieved of the work and responsibility with which I have been burdened for nearly four years.

"I have given of my best in an effort to solve the company's problems. I feel that much has been accomplished, and I hope to be of some assistance in the future.

"I shall remain a director as long as desired and help in any way I can about the financial plan, the sale of the 'outside properties,' the general policy of the company, and will advise with the officers as frequently as desired by them.

"As a member of the committee of five railway executives appointed at the request of the National Council of Defense, I shall endeavor to help New England obtain the necessary fuel, food and supplies.

"I want to express my thanks to the many men in the service, officers and employees, who have worked hard and loyally to help carry the company along up to the present time—to the public service commissions that have been helpful, and to the press that has been most cordial and helpful in pointing out the great necessity of rehabilitating the company in the interest of New England, and to many public bodies and patrons of the road.

"The board of directors have authorized me to announce the election, to take effect May 1, of E. J. Pearson as president of the New York, New Haven & Hartford; Benjamin Campbell as senior vice-president of the New York, New Haven & Hartford, and president of the New England Steamship Company, the Hartford & New York Transportation Company and the New Bedford, Martha's Vineyard & Nantucket Steamboat Company; and the creation of a committee of intercorporate relations consisting of the presidents and vice-presidents of the various companies comprising the New Haven system. I am to be chairman of this committee and work with the various presidents to co-ordinate and harmonize the activities of the various companies."

Edward J. Pearson, who succeeds Mr. Elliott, is one of the

hardest workers among the many hard working railroad executives. Physically strong, with a remarkable memory for details, sure of the soundness of his opinions and ready to tackle any problem, no matter how difficult, he faces about the most difficult problem that there is to-day in the management of an American railroad. Although an engineer by education—a graduate of Cornell—the greater part of Mr. Pearson's work in recent years has been in the operating department. He was, however, chief engineer of the Chicago, Milwaukee & Puget Sound, which built the Pacific coast extension of the Chicago, Milwaukee & St. Paul. On this big piece of work he showed great ability as an organizer. Most of his railroad work has been in the West, but for the last nine months as vice-president in charge of operation, construction and maintenance he has been the active head of these departments of the New York, New Haven & Hartford. He is a man with original ideas, with large plans and strength of character necessary to carry out his own ideas against opposition. Personally rather diffident, in his work he has great tenacity of purpose and great self-confidence. He is a man who studies problems in detail.

Edward J. Pearson was born in 1863 at Rockville, Ind. After graduating from the engineering department of Cornell University he began railroad work in 1880 as rodman on the Missouri Pacific. He worked later in the engineering department of the Missouri, Kansas & Texas, and in 1883 became assistant engineer on the Northern Pacific. Two years later he was appointed supervisor of bridges, buildings and water supply of the Minnesota and St. Paul divisions. In 1890 he was appointed division engineer of the Eastern division of the Northern Pacific, and two years later was made principal assistant engineer at Chicago in charge of construction work of the Chicago terminal lines and the Wisconsin Central terminal, then being operated by the Northern Pacific. In 1894 Mr. Pearson was made superintendent of the Yellowstone division of the Northern Pacific, and in the following year was transferred as superintendent to the Rocky Mountain division. In 1898 he was made superintendent of the Pacific division and four years later was promoted to assistant general superintendent. In 1903 he was made acting chief engineer, and in 1904 chief engineer. In December, 1905, he went to the St. Paul as chief engineer of the Chicago, Milwaukee & Puget Sound. When this road was completed in 1911 he went to the Missouri Pacific as vice-president under Benjamin F. Bush, in charge of maintenance, operation and construction. He was there four years and then became vice-president of the Texas & Pacific in charge of all departments. He had been on the Texas & Pacific about a year when the vice-presidency of the New Haven was offered to him and he accepted.

BRITISH RAILWAY-OWNED CANALS.—According to the railway returns for the year 1913 the amount of capital invested in canals by the railways of the United Kingdom was £21,078,525 (\$102,441,630) and the mileage was 1,033. The railways of England and Wales had 853 miles, which had cost £19,475,735 (\$94,652,072), the Scottish companies had 84 miles on which £1,267,525 (\$6,120,172) had been expended, while the Irish railways had 96 miles with an expenditure of £335,265 (\$1,729,388).

EUROPEAN PASSENGER FARE ADVANCES.—In all belligerent countries surrounding Switzerland railway passenger fares have been raised since the war, except in Germany, and she is now about to raise them. Moreover, even she has raised a good deal of money by extra stamps on bills of lading and similar additional charges. Austria, on February 1, last, increased her railway fares for slow trains by 15 to 43 per cent and for express trains by 10 to 30 per cent, while on January 1, 1917, she raised the cost of general and other season tickets.

General News Department

The Chicago & Alton recently granted an increase in pay of from \$10 to \$25 a month to its chief dispatchers, assistant dispatchers, yardmasters and traveling engineers.

C. R. Richards, professor of mechanical engineering of the University of Illinois and head of that department since 1911, has been appointed dean of the college of engineering and director of the engineering experiment station, to succeed W. F. M. Goss, who recently resigned to become president of the Railway Car Manufacturers' Association of New York.

The multiplex high speed telegraph apparatus of the Western Electric Company has been endorsed by a special committee appointed by the British Postmaster-General and the system has been put in use on a circuit between London and Manchester. The report of the committee says that this system has handled at least two-thirds of the entire telegraphic traffic between these cities over a single circuit.

Judge Brandmiller, of Youngstown, Ohio, co-operating with the chief of police and the officers of the railroad, has sentenced 31 trespassers, arrested in a single day last week, to work ten days each at the Erie Railroad freight house; and also to fines of \$5 and costs, the fine to be suspended if a man works in a satisfactory way. It is arranged to pay the men for their work \$2.20 for ten hours. They are to sleep in the municipal lodging house and be fed at restaurants; and the money earned by working, less what is paid out, is to be paid to the men at the end of the ten days.

Secretary Baker of the War Department has issued an announcement that standard Pullman and tourist sleepers will not be used for the transportation of troops under ordinary conditions. Day coaches will be used on the basis of one officer to each double seat, and three men to each two double seats, this order to apply in all cases except journeys of unusual length covering more than one night and one day, which cases will be separately considered when they arrive. Secretary Baker said this regulation was necessary owing to the limited number of sleeping cars available.

A number of purchasing agents and other railroad officers testified at a hearing this week before the Federal Trade Commission regarding the increased prices of coal. Among them were George G. Yeomans, purchasing agent of the New York, New Haven & Hartford; S. B. Wight, general purchasing agent of the New York Central; A. W. Thompson, vice-president, and E. H. Bankard, purchasing agent of the Baltimore & Ohio; G. N. Orcutt, vice-president of the Erie; M. S. Connors, general manager of the Hocking Valley, and J. T. Wallis, superintendent of motive power, and S. Porcher, purchasing agent of the Pennsylvania.

H. C. Phillips, general secretary of the Presidents' Conference Committee for the Federal Valuation of the Railroads, has issued a circular explaining in detail the requirements of the supplemental instructions to order No. 7, issued by the division of valuation with reference to the scheduling of land of the carrier. This circular contains detailed suggestions regarding the manner in which carriers can comply with this order and calls attention to the complaint made by the director of the division of valuation recently that the returns to be made by the roads under this order have been very dilatory, as a result of which he has given notices in some instances that he will be compelled to ask the commission to impose the penalty mentioned in the act for non-compliance if the returns are not filed within the specified time.

More Labor Agitation

Shop crafts on a number of lines west of Chicago and St. Louis have made formal requests for advances in pay and shorter hours of work. In general the men are asking for 10 cents more an hour and an eight-hour working day. A strike of 700

telegraph operators of the Missouri, Kansas & Texas was called on April 19 by H. C. Braham, president of the order of railway telegraphers. The men are demanding recognition of the order of railway telegraphers. Another source of complaint is that the Katy has recently been substituting telephone stations for telegraph stations on its line.

Railway Executive Committee on National Defense

The executive committee of the American Railway Association Special Committee on National Defense, of which Fairfax Harrison, president of the Southern Railway, is chairman, and which is to direct the operation of the railways for war purposes, held its first session at Washington beginning on Monday. The committee will hold frequent, or, if necessary, continuous sessions in Washington. E. E. Clark, of the Interstate Commerce Commission, has been designated by the commission to sit with the committee as an ex-officio member. Questions of car service were discussed at the first meeting, and members of the Car Service Commission were called into conference.

Court Says Insufficient Revenues Mean Inadequate Service

That courts as well as shippers are beginning to more fully recognize that adequate service is more important than low rates is evidenced by a recent opinion of the Illinois Supreme Court in a grain rate case which had been pending for several years. (State Public Utilities Commission of Illinois ex rel. Farmers' Illinois Grain Dealers' Association et al. v. A. T. & S. F. Ry. Co. et al.) The court said in part:

"The railroads are entitled to fair treatment and to charge such rates as will enable them to make a fair return on the capital invested in those enterprises, and the shippers and patrons of the railroads are entitled to protection from extortionate charges, and to have their products carried at reasonable rates. Primarily as a practical matter of business the farmers, the shippers and the business interests of the country want service, they want cars for their products and merchandise, and want the railroads kept in such condition and with sufficient equipment to handle the business of the country under conditions which, as shown by the evidence before the commission, and which we know as a matter of common observation, have changed since the maximum rates were fixed by the Railroad and Warehouse Commission in 1906. It would be a short-sighted policy and result in enormous losses to the farmers and shippers if the railroads were not able on account of inadequate receipts to provide the cars and other betterments necessary to take care of the business offered them."

Trade Journals Declare for Universal Service

The New York Business Publishers' Association, composed of the trade and technical journals in New York, unanimously adopted resolutions at its monthly meeting Monday night indorsing universal military training and service, and pledging its support to the government in the sale of bonds necessary to carry on the war. Colonel Charles E. Sherrill, ex-minister to Argentina, introduced the resolution advocating universal military service. He obtained the consent of the publishers to send the following telegram to the United States senators from New York:

"Last spring, during the great preparedness movement initiated by New York City's parade of 140,000, and resulting in about 2,800,000 paraders in over 90 cities, the one most efficient factor was the unremitting co-operation of the trade journals. As a result of that experience, they tonight, assembled as the New York Business Publishers' Association, representing 100 trade journals, unanimously oppose the volunteer system for raising our army, and declare themselves emphatically in favor of universal military service in war as the only practical and democratic method of defending our great republic."

The editorial conference of the New York Business Pub-

lishers' Association, Inc., has also pledged its support. An offer to the government by 277 class journals of the United States to give editorial co-operation and free advertising space to support government activities in connection with the war was made last week. The telegrams offering this co-operation were taken to Washington on April 17 by Arthur J. Baldwin, vice-president, McGraw-Hill Publishing Company, and A. C. Pearson, secretary of the United Publishers' Corporation. They were received by Secretary Daniels of the Navy Department; George Creel, the recently appointed head of the Board on Censorship and Publicity; Grosvenor B. Clarkson, secretary of the Council of National Defence, and Howard E. Coffin, of the Advisory Board to the Council.

The *Railway Age Gazette* and all other Simmons-Boardman papers are members of the New York Business Publishers' Association, Inc., and of the editorial conference.

Committee on Shipping

At the meeting of the Council of National Defense at Washington on April 21 there was created a Committee on Shipping, to consist of Chairman Denman, of the Federal Shipping Board; P. A. S. Franklin, president, International Mercantile Marine; H. H. Raymond, president, Coastwise Shipping Association; Eugene T. Chamberlain, commissioner, Bureau of Navigation, Department of Commerce; D. T. Warden, manager of the foreign shipping department, Standard Oil Company; L. H. Sherman, vice-president, W. R. Grace & Co.; E. M. Bull, vice-president of E. M. Bull & Co., and Frank C. Munson, president of the Munson Steamship Line. The function of the Committee on Shipping will be to advise with the U. S. Shipping Board, and to report through Mr. Denman to the council as to the best methods of increasing tonnage available for shipment to the Allies. It is understood that one of the projects to be considered is a plan for taking any available boats now engaged in coastwise traffic for the trans-atlantic service.

Russian Railway Officers Not Allowed Enough Leeway

What is needed to make the operation of the Russian railways more efficient is more leeway for subordinate officers on the part of the governmental authorities, says Mr. Charles M. Muchnic, vice-president of the American Locomotive Sales Corporation, in a letter to Secretary of Commerce Redfield. Mr. Muchnic's letter was brought out by a report circulated in Washington recently to the effect that the Russian government had appealed to the United States for assistance in improving and rebuilding its railways. It was reported that a project was under way for sending to Russia a large number of American railway men of all ranks and from all branches of the service for that purpose. Muchnic, in connection with his work, has studied the Russian railway situation very closely. In his letter to Secretary Redfield he said:

"It is wrong and unfair to assume that Russian railway men as individuals do not understand their business, or are not as capable as other railway engineers in any part of the world. The alleged chaotic conditions that exist on the Russian railways are not due to the individual men, or to the executive officials of various sections or divisions of their railways, but to the central organization that directed such railways, and which virtually deprived the managers, superintendents, master mechanics or other executives in subordinate positions of the necessary freedom of action that is essential in operating successfully a railway or any other enterprise.

"Therefore the remedy does not lie, in my estimation, in sending these practical railway men to Russia, who could not acquire in less than three years a knowledge of Russian conditions, which are totally different from ours, a knowledge of the language or idiosyncracies of the people, and of the ability of the rank and file whom they have to direct; it lies in the reorganization of the central administrative office of the Russian railways, i. e., of the ministry of railways.

"My belief is that a greater service could be rendered Russia and the problems the Russian railways are confronted with could be solved much more expeditiously and smoothly by sending a commission of a few big railway men of the type of Underwood or Daniel Willard, who, with broad powers of suggestion and direction, would act as advisory board to the ministry of railways. Such a board could institute the reforms that are

doubtless necessary in the operation of the railways of Russia without creating any friction or antagonism, and could utilize the excellent material that exists in Russia in the rank and file of the large Russian army of efficient railway executive officials."

President Rea on Proposed Rate Advance

Speaking for the eastern carriers, Samuel Rea, president of the Pennsylvania Railroad, made a statement regarding the Interstate Commerce Commission's orders allowing the roads to file supplements proposing an increase in freight rates. He pointed out that the proposed effective date of the new rates is to be July 1, and they must be filed with the commission at least 50 days in advance of that time, or by May 11. "This will give at least 50 days in which the commission may carry out its expressed purpose of hearing and considering any protests against the advance before the effective date," he said, "and the carriers earnestly hope that, in view of the emergency that exists, the commission will find it possible to decide the case within that period without the necessity for a suspension to a later date.

"The railroads have never asked that the case be decided without a full hearing. They believe that the fullest investigation by the commission will demonstrate the necessity of increasing their revenues if the railroads are to be placed in a condition to serve the country properly in view of the great task imposed upon them as result of the war. They feel, however, that the commission has a full knowledge of the situation, and should be able to ascertain all the facts which should influence its decision between now and July 1.

"The bulletin issued today by the Interstate Commerce Commission of the earnings and expenses of the railroads for the month of February reveals clearly the decreasing tendency of railway net earnings which has been apparent for many months, and which has not yet had its full effect. For the month of February, while gross earnings were still increasing, expenses were increasing so much faster that they consumed 78.37 per cent of the railway earnings in that month, as compared with 70.19 per cent in the corresponding month of the previous year. This is in spite of the fact that the February figures do not in many cases yet include the increased prices of fuel which are being superimposed on enormous increases in all kinds of materials and supplies, and the increased wages brought about directly and indirectly by the Adamson law. The railroads are not asking higher rates for the purpose of increasing their profits, but to measurably offset known increased expenses at a time when the demands to be imposed upon them require that they shall have the ability to properly perform their duties to the country.

"The railroads are gratified that the commission has shown its appreciation of the importance of presenting the question for consideration in this manner, thereby avoiding the great expenses and delay incident to the publication of complete tariffs."

A. R. A. Spring Meeting Postponed Indefinitely

In view of the present national crisis and the earnest desire of railroad companies to render the greatest service and to heartily co-operate with the government in the conduct of the war, the executive committee of the American Railway Association has postponed indefinitely the spring session of the association which was to have been held May 16.

Association of Railway Claim Agents

The convention of the Association of Railway Claim Agents, scheduled for May 16, 17 and 18, at Cincinnati, Ohio, has been indefinitely postponed.

In due time, as circumstances may permit, a special business meeting may be called to decide the course of the association during the period of the war.

Boiler Makers' Supply Men's Association

The executive committee of the supply manufacturers' organization which meets in conjunction with the Master Boiler Makers' Association has decided not to hold an exhibit this year.

MEETINGS AND CONVENTIONS

The following list gives names of secretaries, dates of next or regular meetings and places of meeting of those associations which will meet during the next three months. The full list of meetings and conventions is published only in the first issue of the Railway Age Gazette for each month.

- AIR BRAKE ASSOCIATION.**—F. M. Nellis, Room 3014, 165 Broadway, New York City. Next annual convention, May 1-4, 1917, Hotel Chisca, Memphis, Tenn.
- AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.**—F. A. Pontious, 455 Grand Central Station, Chicago. Next meeting, July 18, 1917, Asheville, N. C.
- AMERICAN ASSOCIATION OF FREIGHT AGENTS.**—R. O. Wells, Illinois Central, Chicago, Ill. Next meeting, June, 1917, Denver.
- AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.**—J. W. Taylor, 1112 Karpen Bldg., Chicago. Next meeting, June 13-20, Atlantic City, N. J.
- AMERICAN SOCIETY OF CIVIL ENGINEERS.**—Chas. Warren Hunt, 220 W. 57th St., New York. Regular meetings, 1st and 3d Wednesday in month, except July and August, 220 W. 57th St., New York.
- AMERICAN SOCIETY OF MECHANICAL ENGINEERS.**—Calvin W. Rice, 29 W. 39th St., New York. Next convention, May 21-24, Cincinnati, Ohio.
- ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.**—E. R. Woodson, Rooms 1116-8 Woodward Bldg., Washington, D. C. Annual meeting, May 30, 1917, Hotel Jefferson, Richmond, Va.
- ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.**—W. L. Connelly, Superintendent of Telegraph, Indiana Harbor Belt, Gibson, Ind. Next meeting, April 19, La Salle Hotel, Chicago.
- CANADIAN RAILWAY CLUB.**—James Powell, Grand Trunk, P. O. Box 7, St. Lambert (near Montreal), Que. Regular meetings, 2d Tuesday in month, except June, July and August, Windsor Hotel, Montreal, Que.
- CANADIAN SOCIETY OF CIVIL ENGINEERS.**—Clement H. McLeod, 176 Mansfield St., Montreal, Que. Regular meetings, 1st Thursday in October, November, December, February, March and April. Annual meeting, January, Montreal.
- CAR FOREMEN'S ASSOCIATION OF CHICAGO.**—Aaron Kline, 841 Lawlor Ave., Chicago. Regular meetings, 2d Monday in month, except June, July and August, Hotel La Salle, Chicago.
- CENTRAL RAILWAY CLUB.**—H. D. Vought, 95 Liberty St., New York. Regular meetings, 2d Friday in January, May, September and November. Annual dinner, 2d Thursday in March, Hotel Statler, Buffalo, N. Y.
- CINCINNATI RAILWAY CLUB.**—H. Boutet, Chief Interchange Inspector, Cin'ti Rys., 101 Carew Bldg., Cincinnati. Regular meetings, 2d Tuesday, February, May, September and November, Hotel Sinton, Cincinnati.
- ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.**—Elmer K. Hiles, 2511 Oliver Bldg., Pittsburgh, Pa. Regular meetings, 1st and 3d Tuesday, Pittsburgh, Pa.
- FREIGHT CLAIM ASSOCIATION.**—Warren P. Taylor, Traffic Manager, R. F. & P., Richmond, Va. Annual convention, June 19, Chicago, Ill.
- GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.**—A. M. Hunter, 321 Grand Central Station, Chicago. Regular meetings, Wednesday, preceding 3d Thursday in month, Room 1856, Transportation Bldg., Chicago.
- INTERNATIONAL RAILWAY FUEL ASSOCIATION.**—J. G. Crawford, C. B. & Q. R. R., 702 E. 51st St., Chicago. Next meeting, May 14-17, Hotel Sherman, Chicago.
- MASTER BOILERMAKERS' ASSOCIATION.**—Harry D. Vought, 95 Liberty St., New York. Annual convention, May 22-25, Hotel Jefferson, Richmond, Va.
- MASTER CAR BUILDERS' ASSOCIATION.**—J. W. Taylor, 1112 Karpen Bldg., Chicago. Next meeting, June 13-20, Atlantic City, N. J.
- NEW ENGLAND RAILROAD CLUB.**—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meeting, 2d Tuesday in month, except June, July, August and September, Boston.
- NEW YORK RAILROAD CLUB.**—Harry D. Vought, 95 Liberty St., New York. Regular meeting, 3d Friday in month, except June, July and August, 29 W. 39th St., New York.
- NIAGARA FRONTIER CAR MEN'S ASSOCIATION.**—Geo. A. J. Hochgrebe, 623 Brisbane Bldg., Buffalo, N. Y. Meetings, 3d Wednesday in month, New York Telephone Bldg., Buffalo, N. Y.
- PACIFIC RAILWAY CLUB.**—W. S. Wollner, Assistant to Chief Engineer, Northwestern Pacific R. R., San Francisco, Cal.
- PEORIA ASSOCIATION OF RAILROAD OFFICERS.**—F. C. Stewart, 410 Masonic Temple Bldg., Peoria, Ill. Regular meetings, 3d Thursday in month, Jefferson Hotel, Peoria.
- RAILROAD CLUB OF KANSAS CITY.**—Claude Manlove, 1008 Walnut St., Kansas City, Mo. Regular meetings, 3d Saturday in month, Kansas City.
- RAILWAY CLUB OF PITTSBURGH.**—J. B. Anderson, Room 207, P. R. R. Sta., Pittsburgh, Pa. Regular meetings, 4th Friday in month, except June, July and August. Pittsburgh Commercial Club Rooms, Colonial Annex Hotel, Pittsburgh.
- RAILWAY DEVELOPMENT ASSOCIATION.**—D. C. Welty, Commissioner of Agriculture, St. L., Iron Mt. & So., 1047 Railway Exchange Bldg., St. Louis. Annual meeting, May 9-11, Louisville, Ky.
- RAILWAY SIGNAL ASSOCIATION.**—C. C. Rosenberg, Myers Bldg., Bethlehem, Pa. Next meeting, June 12-13, Hotel McAlpin, N. Y.
- RAILWAY STOREKEEPERS' ASSOCIATION.**—J. P. Murphy, N. Y. C. R. R., Box C, Collinwood, Ohio. Annual convention, May 21-23, Hotel Sherman, Chicago.
- RICHMOND RAILROAD CLUB.**—F. O. Robinson, C. & O., Richmond, Va. Regular meetings, 2d Monday in month, except June, July and August.
- ST. LOUIS RAILWAY CLUB.**—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August, St. Louis.
- SOUTHERN & SOUTHWESTERN RAILWAY CLUB.**—A. J. Merrill, Grand Bldg., Atlanta, Ga. Regular meetings, 3d Thursday, January, March, May, July, September, November, 10 a. m., Piedmont Hotel, Atlanta.
- TRAFFIC CLUB OF CHICAGO.**—W. H. Wharton, La Salle Hotel, Chicago.
- TRAFFIC CLUB OF NEW YORK.**—C. A. Swope, 291 Broadway, New York. Regular meetings, last Tuesday in month, except June, July and August, Waldorf-Astoria Hotel, New York.
- TRAFFIC CLUB OF PITTSBURGH.**—D. L. Wells, Gen'l Ag't, Erie R. R., 1924 Oliver Bldg., Pittsburgh, Pa. Meetings bi-monthly, Pittsburgh.
- TRAIN DESPATCHERS' ASSOCIATION OF AMERICA.**—J. F. Mackie, 7122 Stewart Ave., Chicago. Next meeting, June 19, Fresno, Cal.
- UTAH SOCIETY OF ENGINEERS.**—Frank W. Moore, 1111 Newhouse Bldg., Salt Lake City, Utah. Regular meetings, 3d Friday in month, except July and August, Salt Lake City.
- WESTERN CANADA RAILWAY CLUB.**—L. Kon, Immigration Agent, Grand Trunk Pacific, Winnipeg, Man. Regular meetings, 2d Monday, except June, July and August, Winnipeg.
- WESTERN RAILWAY CLUB.**—J. W. Taylor, 1112 Karpen Bldg., Chicago. Regular meetings, 3d Monday in month, except June, July and August, Hotel Sherman, Chicago.

Traffic News

The Denver & Rio Grande will inaugurate open-top observation car service through the Royal Gorge and through the Black Canyon of the Gunnison, beginning May 13.

The Chicago Association of Commerce, in a statement given out recently, endorsed the bill now pending in the Illinois legislature providing for an increase in passenger fares in Illinois from 2 cents a mile to 2.4 cents.

A hearing will take place in the United States District Court at St. Louis on April 30, on the petition of the Interstate Commerce Commission for an injunction to restrain the railroads operating between Illinois points and St. Louis from charging intrastate rates discriminatory against the interstate passenger rate of 2.4 cents.

The schedules of the Panama Limited of the Illinois Central and the Sunset Limited of the Southern Pacific have been changed so that direct connection can be made from one train to the other at New Orleans, La. The Panama Limited now arrives in New Orleans 15 minutes earlier and the Sunset Limited leaves 30 minutes later, the extra half hour being absorbed in the running time between New Orleans and Houston, Tex.

In spite of the recent decision of the Missouri State Supreme Court, permitting the Missouri Public Service Commission to put into effect freight and passenger rates higher than those provided for by state statute, the commission has postponed the date when the new passenger tariffs shall become effective, pending a hearing set for May 31. No order was made with reference to the freight rate increase, which will go into effect twenty days after the tariff is filed with the commission.

The Illinois Central and 36 other railroads of Illinois recently filed an appeal in the Sangamon County Circuit Court from the order of the State Public Utilities Commission of Illinois regarding the distribution of grain cars. The order required the railroads to distribute grain cars at various stations in proportion to the amount of business the stations have done on the average in the last four years and that cars be distributed among shippers at each station in proportion to their immediate requirements.

With reference to the bill now pending in the Illinois state legislature, proposing an advance in intrastate passenger rates from 2 cents to 2.4 cents, the directors of the Illinois Manufacturers' Association have passed the following resolution: "Resolved, That the Illinois Manufacturers' Association is in favor of House Bill 681, which provides for the increase of the maximum passenger rate in Illinois from 2 cents to 2.4 cents, provided, however, the measure shall be so amended so that no increase shall be made without the approval of the State Public Utilities Commission. We believe the proposed measure is strictly in harmony with the recommendations of the Interstate Commerce Commission of the United States, and that it would serve the best interests not only of the carriers, but of the industries of Illinois."

The aggregate shortage of freight cars on the railroads of the United States on April 1, as reported to the American Railway Association, was 143,059. This was an increase of 12,977 cars over the shortage on March 1, and was the largest reported since the present freight congestion and shortage began last September, as well as the largest car shortage ever reported by the railroads. This large increase in shortage is, no doubt, due in part to the practice of shippers, who, because of their knowledge of probable delays, double their orders accordingly. It is believed also that in reporting shortages there is much duplication. A shipper frequently files an identical order for cars with all railroads that could take his shipment. Manufacturers and consumers nowadays frequently place orders for materials with a number of companies, hoping thereby to secure a full amount of material needed, and each recipient of these orders then usually files a request immediately for enough cars for the whole lot.

Embargo on Arms to Mexico

An important embargo from a military point of view was recently placed by the railroads of the country at the direction of the United States Government. Hereafter no shipments of arms or ammunition may be moved to Mexican border points unless covered by a government bill of lading or expressly approved by the war department. The prohibition not only covers the acceptance of shipments at points of origin, but also in transit.

Hardwood Lumbermen Oppose Rate Advances

At a meeting of the Southern Hardwood Traffic Association at Memphis, Tenn., on April 17, a resolution was passed which called for prompt and vigorous action on the part of the association in opposition to the advanced rates proposed by the railroads. The resolution reads in part as follows:

"During last five years the carriers have asked for and received tremendous increases in rates on forest products. This is especially true of the Mississippi Valley territory, where very heavy increases have been allowed, in some instances amounting to 40 per cent. In I. & S. dockets Nos. 184, 520, 745, 775 and other advances were allowed. In the last named docket we were practically assured by the carriers that, if they succeeded in getting this advance, they would not undertake any further advances in hardwood rates. In view of these radical advances we feel that no further advances should be allowed from this section in the rates on hardwood forest products; therefore, be it

"Resolved, That any advances in hardwood rates be suspended, and the Interstate Commerce Commission hold a full investigation at which both carriers and shippers can be heard, etc."

Illinois Manufacturers Favor Rate Advances

The traffic committee of the Illinois Manufacturers' Association has adopted the following resolution relative to railroad rates:

"Whereas, Conditions now existing compel increased expenditures by the carriers to meet greater operating costs; and,

"Whereas, The carriers by application to the Interstate Commerce Commission have asked permission to advance rates generally from 5 per cent to 15 per cent; and,

"Whereas, The Illinois Manufacturers' Association, after due consideration, deem the carriers' application for increased rates just; therefore, be it

"Resolved, That the Traffic Committee of the Illinois Manufacturers' Association respectfully recommend that the Interstate Commerce Commission permit the carriers by appropriate general tariffs, to establish such increased rates as in the judgment of the commission they are justly entitled to, and that pending conclusion of a proper but not too protracted investigation by the commission such tariffs be not suspended in the usual manner."

Embargoes Shifting

Although quite a number of embargoes on traffic between Chicago and the seaboard are being lifted or modified at various points, a like number of new embargoes are being placed at other points. The condition of traffic in this area seems to be one of shifting from one point to another rather than showing any permanent general improvement. The Delaware & Hudson, which on March 24 placed an embargo on freight from connecting lines through junction points south and west of Schenectady, N. Y., and Albany, destined to points on or via connecting lines at Schenectady, Mechanicville, Troy and Albany, recently modified that embargo to permit shipments of livestock, perishables, railroad and government freight. It will also accept coal, iron and steel, lumber and cement when cars are loaded to full marked or cubic capacity. On April 19, the Pennsylvania Railroad placed an embargo on all grain billed to Altoona, Pa., or Renovo for reconsignment. While various embargoes on freight destined to the port of New York were recently modified, further restrictions were placed on the movement of freight to Philadelphia and Baltimore. The Merchants' and Miners' Transportation Company recently extended its embargo on freight from Philadelphia, Baltimore and other nearby points to cover all freight from connecting lines for movement northbound by its Baltimore-Boston ocean line. Although navigation is

opening on the St. Lawrence, the reservation of all shipping space for government supplies has forced the Canadian Pacific and the Grand Trunk to embargo all export freight destined to the port of Montreal, except such as is consigned to or in the care of A. H. Harris, director of overseas transports. Of late there has been considerable congestion at transfer points for I. c. l. freight in Ohio. Under date of April 16 the Erie placed an embargo on all I. c. l. freight destined west to Youngstown, except foodstuffs, perishables, company and government materials. The Cincinnati, Hamilton & Dayton similarly embargoed all I. c. l. freight for delivery at or to be handled through its freight house at Dayton, Ohio. A strike of truckers in the joint freight house of the Toledo, St. Louis & Western, and the Hocking Valley at Toledo, caused those roads to place an embargo last week on perishable freight in I. c. l. lots destined for that point.

Car Service Rules Criticized

Shippers individually and collectively are showing increasing dissatisfaction with the present car service rules, which have been in effect since February 21. The executive committee of the National Industrial Traffic League has directed the president of the League to take up the matter of the rules with the Interstate Commerce Commission, and also with the commission on car service of the American Railway Association, expressing the view of the league that the present rules have not only failed to improve conditions, but have seriously interfered with the free movement of the traffic of the country, and that the rules have had sufficient trial to demonstrate their impracticability. The committee recommends that the attempt to enforce the rules now in operation be immediately abandoned, and that the Interstate Commerce Commission arrange as promptly as possible a joint conference of representatives of the American Railway Association and shipping interests for the purpose of working out a satisfactory plan for the interchange of freight car equipment.

At a meeting of the Southern Hardwood Traffic Association at Memphis, Tenn., on March 17, a resolution was adopted expressing the dissatisfaction of the association with the present rules, and urging that the Interstate Commerce Commission hold a hearing as soon as possible to investigate the possibilities of a universal car pool, and after a prompt and thorough inquiry to recommend to Congress the passage of a bill legalizing a car pool arrangement under the supervision of the commission. It was asserted that the car situation which has been confronting the hardwood forest products industry of the South for the last seven months has necessitated the closing of plants, throwing men out of employment, jeopardizing investments in the industry and causing great financial loss. The rules have not improved the situation, but, on the contrary, in many instances have had the effect of absolutely stopping empty foreign cars from coming to southern lines.

There is disaffection also in the ranks of railway employees as a considerable number of lines are refusing to abide by the rules, among which are the following: The Canadian Government railways, the Canadian Northern, the Canadian Northern Ontario, the Canadian Northern Quebec, the Southern Railway System, the Central Vermont, the Grand Trunk, the Grand Trunk Pacific, the International & Great Northern, the Kansas City, Mexico & Orient, the Missouri, Kansas & Texas, the Missouri, Oklahoma & Gulf, the Mobile & Ohio, the Pere Marquette, the Quebec, Montreal & Southern, the St. Louis-San Francisco, the St. Louis Southwestern, the Toledo, St. Louis & Western and the Wabash. The St. Louis-San Francisco, on the grounds that it was being pressed against its will to sign the new rules by the commission on car service for the American Railway Association and the Interstate Commerce Commission, appealed to shippers along its line to communicate to the Interstate Commerce Commission their approval of the stand it had taken. The Frisco's criticism of the rules is in part as follows: If an industry receives a carload of freight it cannot reload the car unless it can load it to the owning line or where the owning line will participate in the through freight rate. No matter how important a shipment may be, the consignee must submit to having the car hauled away empty and wait until another car can be found for his load. The rules result in the movement of a great many cars empty that should move loaded and, instead of relieving a freight blockade, add to it.

Commission and Court News

INTERSTATE COMMERCE COMMISSION

The commission has suspended until August 21 tariffs naming increased switching charges at Minneapolis and St. Paul on car-load freight switched between industries on the lines of the Chicago, Milwaukee & St. Paul and the Minneapolis & St. Louis, and points of interchange with connections applicable on traffic originating at or destined to points on connecting lines.

An informal hearing on tariffs filed by the railroads increasing rates on iron ore from lake ports by 15 cents per ton was held before the suspension board of the Interstate Commerce Commission at Washington on Monday. Representatives of a number of furnace operators asked that the tariffs be suspended pending the issuance of the commission's report on its general investigation of ore rates, saying that while they were willing to help the railroads they could not stand two increases. When someone mentioned Clifford Thorne's statement that the Chesapeake & Ohio had contracted for some coal at \$1.08 a ton, R. H. Large, coal traffic manager of the Pennsylvania, said that his company had contracted for about two million tons at a minimum price of \$1.90, which was an increase of 80 cents as compared with last year's price, and that for the still greater part of its requirement yet unfilled the price would be even greater.

STATE COMMISSIONS

The Baltimore & Ohio was cited to appear before the State Public Utilities Commission of Illinois on April 25 to show cause for the issuance of \$136,823,800 of securities without the authority of the commission.

The new public utilities act of Utah, to enforce the provisions of which a public utilities commission consisting of three members was created, became effective upon the approval of the governor on March 8, 1917. Under the act all public utilities, including transportation companies, are required to file with the commission their schedules of rates and fares, as well as rules and regulations governing them. The act contains the usual prohibitions against discrimination and rebating, and permits the granting of free transportation only to certain excepted classes such as employees of common carriers and their families, ministers of religion, persons engaged in charitable or eleemosynary work, etc.

COURT NEWS

Sufficiency of Notice of Arrival of Freight

The Texas Court of Civil Appeals holds that a railroad company in discharge of the diligence required of it to notify the owner of freight on its arrival at destination, under the Texas statute, is not bound to look for such person at any place other than the place of destination, as it is the duty of the owner to put himself in position to receive such notice at such place.—*Texas & New Orleans v. Patterson* (Tex.), 192 S. W., 585. Decided February 21, 1917.

Rules as to Car Inspection

In an action by the employee of a shipper for injuries received after loading a car, by the car door, the fastenings of which were loose, falling on him, it appeared that the railroad had a rule requiring shippers to present the inspection card with the bill of lading, the inspection to be made before loading the car. The Tennessee Supreme Court held that failure on the part of the shipper to observe this rule exonerates the railroad from liability for a defective condition of the car. The mere act of placing an uninspected car on the shipper's loading track did not give him an implied invitation to load the car. Nor did such act extend an implied invitation to an employee of the shipper to use the car, since the railroad owed him no duty save through his relationship with the shipper. A mere showing that one car had been loaded without such prior inspection was insufficient to es-

tablish a custom. Judgment for the plaintiff was reversed and the case dismissed.—*N. C. & St. L. v. Myers* (Tenn.), 192 S. W. 168. Decided February 21, 1917.

Sufficiency of Employees for Job

In an action by a track man for injury resulting in a rupture, it appeared that the plaintiff, with three others, was ordered to lift a rail for which work eight men should have been used. The Montana Supreme Court held that the proximate cause of his injury was his foreman's order. The mere fact that the four men had just lifted another rail of the same size and weight in a different place and to a different height did not impute to him knowledge, as a matter of law, that the rail was too heavy. Judgment for the plaintiff was affirmed.—*Sorenson v. Northern Pacific* (Mont.), 163 Pac., 559.

Verbal Train Orders

In a conductor's suit for personal injuries from a collision the issue was whether a verbal order required him to hold his train or to proceed. The Pennsylvania Supreme Court held that expert testimony, that in the operation of trains written orders are safer than verbal orders, was inadmissible; and the erroneous admission of such testimony was calculated to mislead the jury by suggesting that, if the plaintiff's order to hold the train was verbal, he was excusable if he forgot it or gave it his own construction. Judgment for the plaintiff was therefore reversed.—*Kuhn v. Ligonier Valley* (Pa.), 100 Atl., 142. Decided January 8, 1917.

Federal Employers' Liability Act Superseding State Law

A Florida statute defines the liabilities of railroad companies in certain cases, and creates a presumption of negligence in case of damage done to persons by the running of the locomotives or cars or other machinery of a railroad company. The Florida Supreme Court holds that this provision as to presumption of negligence is a matter of substance affecting the liability of railroad companies, and, being in conflict with the provisions of the federal employers' liability act, it is superseded by the federal act, which is paramount and conclusive in cases in which it is applicable. Under that act the burden is on the plaintiff to prove negligence of the defendant that proximately caused the injury alleged.—*L. & N. v. Rhoda* (Fla.), 74 So., 19. Decided January 18, 1917.

Hauling Defective Cars to Repair Points

The Circuit Court of Appeals at Cincinnati has further construed section 4 of the amendment of 1910 to the Safety Appliance Act. This amendment, the court said, was passed by Congress to modify the strictness of the act so as to permit the hauling of defective cars from the place where they are found to be defective to the nearest point at which repairs can be made. The question in the appeal concerned the construction which is to be put on the exception in the section reading: "nothing in this proviso shall be construed to permit the hauling of defective cars by means of chains instead of drawbars, in revenue trains, or in association with other cars that are commercially used, unless such defective cars contain livestock or perishable freight." The construction urged by the railroad and adopted by the Circuit Court of Appeals is that the clause excepts defective chained-up cars from the general hauling permission given in the body of the proviso, and as to them restricts that permission to some method which does not involve hauling them in association with other cars commercially used; and thus by inference it permits the hauling of a chained-up car to the nearest repair point by an engine devoted to only that car, or to hospital trains; or perhaps in some other way. The court rejected the alternative construction contended for by the Government and adopted by the court below. By this construction the exception would refer to three different classes of cars and would forbid the hauling of defective cars (a) by means of chains instead of drawbars; (b) in revenue trains, or (c) in association with other cars commercially used. If this construction were right, the Court of Appeals said, defective cars could not be hauled at all by means of chains instead of drawbars, nor could they be taken even to the nearest repair point unless by themselves and not in association with commercial cars. The judgment of the district court, which penalized the Erie for hauling five defective cars from

its N K yard at Youngstown, Ohio, to its Briar Hill yard, four miles away, in a train in which there were mixed empties and loaded cars in commercial use and interstate commerce, was reversed.—United States v. Erie. Decided March 8, 1917.

The Federal District Court for the Eastern District of Kentucky, in a decision by Judge Cochran, handed down October 14, 1916, holds that hauling a defective car before the defect is discovered is unlawful. As under the original act any hauling of a defectively equipped car was a violation thereof, and the amendment (April 14, 1910) only permits hauling of such a car after discovery of its defective condition to the nearest repair point for repairs, any other hauling and hence a hauling before discovery, though without fault in not discovering, is a violation of the statute.

This was in a case against the Chesapeake & Ohio, charging violation of the law in moving a car from Covington, Ky., toward Silver Grove, Ky., about ten miles, an interstate car with a defective coupling apparatus. The car came from a connecting road at Cincinnati, just north of Covington. It was in proper condition when it left Cincinnati; there was no inspection at Covington; and the defect was discovered and repaired at Silver Grove, which was the first place where the work could have been done. It appears that the defect was not discovered until the car reached Silver Grove. The court says:

"Beyond question, under the safety appliance act as it stood before the amendment of April 14, 1910, the hauling of these cars was a violation thereof. According to the construction placed on the act by the Supreme Court, though a defect arose from no fault of the railroad company, and though it was ignorant thereof and in no fault in not discovering it, if the railroad company hauled it any distance for any purpose, it violated the act. The amendment was enacted to relieve the statute of, at least, some of its absoluteness. The question is: To what extent it did so. It provides that in case the coupling apparatus becomes defective whilst the car is being used it 'may be hauled from the place where such equipment was first discovered to be defective or insecure to the nearest available point where such car can be repaired.' It will be noted that the only hauling of a defectively equipped car which the amendment permits is from the place where the defective condition was first discovered to the nearest repair point, and, as it has been construed, then only for the purpose of repair. It says nothing about hauling such car before such discovery. Possibly there is room to say that it did not occur to the amendment, if we may personify it, that there would be any violation of the act if it was hauled before discovery, at least if there was no fault on the part of the railroad company in not discovering it sooner, and, even more than this, to wit, that it is the presupposition of the amendment that there would be no violation in such a case. It would seem to be just as harsh to punish a railroad company for hauling a defective car, when it was not at fault in discovering its condition, as for hauling it after discovery to a repair point for repairs, when it could not be repaired at the place of discovery. If the permission of the amendment is limited to the latter hauling what we have then is this: If a car becomes defective out on the road at a point where it cannot be repaired, and it is at once discovered, there is no violation of the act in hauling the car to the nearest point for repairs; but if it is not discovered there is a violation in hauling the car from that point thereto, though there may be no fault in not discovering it before reaching such point, and it is discovered and repaired thereat."

The decisions of the Federal courts, in a number of cases cited, sustain the rule now laid down. One of the decisions (226 Fed., 683) is by Judge Martin A. Knapp, who said:

"Without multiplying quotations, it is sufficient to say that the original act as construed by the courts made the carrier liable for any and every movement on its line, in interstate commerce, of a car whose coupling apparatus was out of order. Under no circumstances could such a car be hauled or used without violating the statute; and the penalty was incurred when a car was moved in a defective condition, even if the carrier had been vigilant to discover the defect and yet was actually unaware of its existence. Indeed it was the severity of this absolute prohibition, which did not exempt the necessary movement to a repair shop, that led to the remedial amendment above quoted. But the relief thereby granted is limited by its express terms and manifest intent, and there is no warrant for its further extension. . . ."

UNITED STATES SUPREME COURT

Government Wins Land Grant Suit

The Supreme Court of the United States, in a decision handed down on Monday, affirmed a decree of the district court for the district of Oregon, enjoining the Southern Pacific from disposing of timber and minerals on lands comprised in the grant to the Oregon & California Railroad. The court also upheld the Chamberlain-Ferris law passed by Congress in 1916 forfeiting the railroad's title to over 2,000,000 acres of Oregon and Washington land, and providing for a government sale of the land, minerals, timber, etc. The court held that the decision of the lower court enjoining sale by the railroad of timber and minerals on the land was entirely in accordance with the previous orders of the Supreme Court.

Commission Paid to Forwarder Is a Rebate

The Supreme Court of the United States, in a case against the Lehigh Valley, has affirmed the judgment of the district court for the southern district of New York (222 Fed., 685), holding that a forwarder of freight, who sends in his own name all the freight he can over a railroad which, in consideration of the business thus obtained, pays him a commission or salary calculated on the freight moneys received by the railroad from him, is a "shipper," and the payment in the form of commission or salary or otherwise is a "rebate" or concession in violation of the interstate commerce act.

The suit was instituted at the request of the Interstate Commerce Commission to prevent the road from carrying freight at less than the established rates. The opinion of the court is by Justice Holmes. George W. Sheldon & Co. is an Illinois corporation engaged in the forwarding business in New York City, bringing goods from Europe and charging the importers for the transportation and such other services as it may perform. Of course the expectation is that it will make a profit, though from the uncertainty of ocean freight charges it may lose, as the contract was made in advance. By arrangement with the Lehigh Valley goods were to be sent over that road so far as practicable, and for doing so the forwarder received from the road a varying percentage on the published rates and also a salary of \$5,000 a year. The district court [for the southern district of New York] on April 6, 1915, issued an injunction as prayed.

The court says that "as toward the railroad George W. Sheldon & Co. is consignor and consignee, and although it may be in no case the owner, that does not concern the railroad. Upon the admitted facts there can be no doubt and it is not denied that it is to all intents the shipper of the goods. If the shipper were the owner an allowance would be contrary to the law. The carrier cannot inquire whether the shipper is the owner, and therefore the statute expresses a necessary policy when it forbids in universal terms refunding in any manner any portion of the tariff rates. Any payment made by a carrier to a shipper in consideration of his shipping goods over the carrier's line, comes within the prohibition.

"It is true no doubt that Sheldon maintains offices, advertises the railroad, solicits traffic for it, and does various other useful things, and in short, we assume, benefits the road and earns its money, if it were allowable to earn money in that way. It is true also that in I. C. v. Peavey, 222 U. S., 42, an owner of property transported was held entitled, under section 15 of the act, to an allowance for furnishing a part of the transportation that the carrier was bound to furnish. But that case goes to the verge of what is permitted by the act. The services rendered by Sheldon, although in a personal sense 'connected with such transportation,' were not connected with it as a necessary part of the carriage—were not 'transportation service' in the language of Union Pacific v. Updike, 222 U. S., 215, 220—and in our opinion were not such services as were contemplated in the act of June 29, 1906, amending section fifteen of the original act.

"There is some criticism of the form of the decree [of the district court], but it prohibits with sufficient plainness all payments to Sheldon, whether by way of salary, commission, or otherwise, in consideration of the shipment of goods by Sheldon over the appellant's line." The decree was affirmed.—Lehigh Valley v. United States. Decided April 9, 1917.

Railway Officers

Executive, Financial, Legal and Accounting

Frank C. Wright has been appointed a vice-president of the Bangor & Aroostook, with headquarters at Bangor, Me., in charge of industrial development and such other matters as may be assigned to him from time to time by the president.

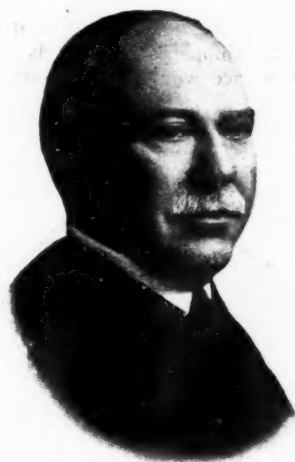
Whitefoord R. Cole, who has been elected chairman of the board of directors of the Nashville, Chattanooga & St. Louis, with headquarters at Nashville, Tenn., as has already been announced in these columns, was born on January 14, 1874, at Nashville, Tenn., and was educated at Vanderbilt University, graduating in the class of 1894.



W. R. Cole

Mr. Cole has been a director for a number of years of the Nashville, Chattanooga & St. Louis, and since 1913 also president of the Nashville & Decatur, which is leased to the Louisville & Nashville. He is a director of the Nashville Railway & Light Company and of a number of industrial companies; also president of the Napier Iron Works and the Crescent Coal Company of western Kentucky. He is a son of the late Col. E. W. Cole, who was president of the Nashville, Chattanooga & St. Louis from 1868 to 1880.

Oliver Martin Spencer, general solicitor for the Missouri district of the Chicago, Burlington & Quincy, with office at St. Joseph, Mo., has been elected general counsel for the system, with headquarters at Chicago, Ill. He was born in Buchanan county, Mo., on August 23, 1849, and graduated from Christian University at Canton, Mo., in 1873. During 1874 and 1875 he attended the Harvard Law School, from which he received the degree of bachelor of laws. He began the practice of the legal profession at St. Joseph in 1875, and in 1880 was elected prosecuting attorney. In 1887 he was elected judge of the circuit court, and resigned in 1891 to become general solicitor for the Missouri district of the



O. M. Spencer

Chicago, Burlington & Quincy, the position he continued to fill up to the time of his appointment, as noted above. Judge Spencer has represented the Burlington in much important litigation, and particularly in the Missouri maximum freight rate case, which was carried to the United States Supreme Court. He succeeds Chester M. Dawes, deceased.

William Church Osborn has been elected chairman of the board of directors of the Texas & Pacific Railway succeeding George J. Gould resigned, and J. L. Lancaster, first vice-president and receiver, at New Orleans, La., has been elected president.

Robert Irwin, assistant claim agent of the Atchison, Topeka & Santa Fe, Coast Lines, with office at Los Angeles, Cal., has been appointed claim agent, with the same headquarters, succeeding W. M. Miller, resigned. Leo Jessen of the claim department has been appointed assistant claim agent, succeeding Robert Irwin, promoted.

Operating

H. F. Burch, acting general superintendent of the Greenwich & Johnsonville at Greenwich, N. Y., has been appointed general superintendent, with office at Greenwich.

J. M. Baths has been appointed superintendent of the Peoria & Pekin Union, with headquarters at Peoria, Ill., vice George Walliser, resigned to accept service with another railway.

C. F. Seymour has been appointed assistant superintendent of the Salt Lake division of the Denver & Rio Grande, with office at Salt Lake City, Utah, succeeding D. E. Wilcox, transferred.

J. L. Brown, assistant car accountant of the Chicago, Milwaukee & St. Paul at Chicago, Ill., has been appointed car accountant with the same headquarters, succeeding W. E. Beecham, assigned to other duties.

George Walliser, superintendent of the Peoria & Pekin Union at Peoria, Ill., has been appointed general manager of the Peoria Railway Terminal Company, with headquarters at Peoria, succeeding J. H. Harris, resigned.

George Dunglinson, Jr., has been appointed assistant to general manager of the Norfolk & Western with office at Bluefield, W. Va. He will have supervision of the company's fuel supply and will perform such other duties as may be assigned to him.

J. H. Lockett, superintendent of the Ogden, Logan & Utah, and D. H. Robinson, superintendent of overhead power, have resigned and their offices are abolished. The duties of the superintendent will be divided between C. C. Swinger and J. D. Boudell, trainmasters. The duties of superintendent of overhead power will be assumed by R. W. Armstrong, chief engineer.

W. M. Legg, president and general manager of the Georgia, Southwestern & Gulf (Albany & Northern), has been elected also general manager of the Valdosta, Moultrie & Western, in charge of the accounting, traffic, operating and maintenance departments, and C. F. Fincher, auditor of the Georgia, Southwestern & Gulf has been elected auditor also of the Valdosta, Moultrie & Gulf. Both with offices at Albany, Ga.

F. P. Smith, general agent of the Chesapeake & Ohio, at Huntington, W. Va., has assumed charge of the Huntington freight station in connection with his other duties, H. C. Hite having been promoted; the office of agent at Huntington is now consolidated with the office of general agent. G. N. Hancock, general agent at Charleston, W. Va., has been granted six months' leave of absence and his former position has been abolished.

Otto Emanuel Halberg, freight car distributor of the Chicago & North Western, at Chicago, Ill., has been appointed assistant superintendent of transportation with the same headquarters. He was born at Ottumwa, Ia., on September 17, 1887, and entered railway service with the Chicago & North Western in October, 1902, as an office boy in the operating department. Since that time he has been promoted from time to time, until now he becomes assistant superintendent of transportation.

M. J. Kennedy has been appointed superintendent of the Northern division, of the St. Louis Southwestern, with office at Pine Bluff, Ark., this division now includes the line from Illmo, Mo., to Pine Bluff, Ark., and all branches between these points, also Pine Bluff terminals; E. Richards, superintendent at Pine Bluff, Ark., has been appointed superintendent of the Middle division, with office at Mount Pleasant, Texas, this division includes the line from Pine Bluff, Ark., to Fort Worth, Texas, and the branches between these points, also the line from Mount Pleasant, Texas, to Tyler; J. E. Callahan, superintendent at Mount Pleasant, Texas, has been appointed superintendent of the Southern division, with office at Tyler, Texas, this division includes all lines south and west of Tyler, Texas, and Tyler terminals.

William Tansley, whose appointment as superintendent of the Canadian Pacific, with headquarters at Montreal, Quebec, has already been announced in these columns, was born on December

27, 1872, at Shelburne, Ont. He was educated in the public schools and began railway work in September, 1889, with the Canadian Pacific, serving as operating agent at various places until 1901, and during the next five years he served as train despatcher at Toronto. He was then for six years chief despatcher and rules instructor at the same place. In 1912 he was appointed assistant superintendent at Havelock, and later was transferred in the same capacity, first to Toronto and later to Smiths Falls. From June to December, 1915, he was acting superintendent of car service at Montreal, and then was appointed assistant superintendent of the Montreal terminals. In February of the following year he was transferred in the same capacity to London, Ont. On February 1, 1917, he was appointed acting superintendent at the same place, and now becomes superintendent of the Laurentian division of the same road, as above noted.

Hanson V. Hilliker, whose appointment as car service agent of the Union Pacific, with headquarters at Omaha, Nebr., was announced in these columns last week, was born at Davenport, Ia., on October 19, 1856, and entered railway service in January, 1873, as a telegraph operator on the Chicago, Rock Island & Pacific, being later agent and train despatcher for the same company. In February, 1884, he became train despatcher on the Union Pacific, and three years later was promoted to assistant to chief despatcher. He was appointed assistant division superintendent at Green River, Wyo., on April 1, 1902, and was transferred to Ogden, Utah, in April, 1904. On June 1, 1905, he was promoted to superintendent of the Utah division of the Union Pacific and Oregon Short Line at Ogden, Utah, and resigned that position in January, 1907. From February, 1907, to date he has been with the Union Pacific as chairman of the board of examiners, trainmaster at North Platte, Nebr., superintendent of the Union Depot & Railway Company, Denver, Colo., transportation inspector and chairman of the efficiency committee, and superintendent of the union station at Omaha, Nebr. He now becomes car service agent, succeeding to part of the duties relinquished by W. A. Whitney, resigned.

Edward C. Manson, announcement of whose appointment as superintendent of transportation of the Union Pacific system, with office at Omaha, Nebr., was made in these columns three weeks ago, was born at Dayton, Ohio, on January 21, 1865. He entered railway service on September 1, 1880, as a telegraph operator with the Scioto Valley, now a part of the Norfolk & Western. In July, 1881, he was employed by the Ohio Central as an operator, and in May, 1882, was made operator and agent for the Columbus, Hocking Valley & Toledo. From March, 1883, to October, 1887, he was operator and train despatcher for the Chicago, Burlington & Quincy, and from October, 1887, to May, 1895, he was train despatcher and trainmaster on the Oregon Short Line. On June 1, 1895, he was appointed superintendent of car service of the International & Great Northern, and on May 1, 1897, returned to the Oregon Short Line as chief despatcher. He was promoted to superintendent of the Idaho division on December 25, 1898, and on June 1, 1905, he went to the Southern Pacific as superintendent of the Salt Lake division. On June 1, 1910, he was appointed general superintendent and assistant general manager of the Oregon Short Line, and on July 1, 1914, was made superintendent of transportation and telegraph. He is now appointed superintendent of transportation of the entire Union Pacific system, succeeding W. A. Whitney, resigned to accept service with another company.

William A. Baldwin, general superintendent of the Erie lines east of Salamanca, with office at New York, has been appointed general superintendent of the lines west, with headquarters at Youngstown, Ohio, vice Franklin G. Robbins, who has been transferred as general superintendent to the Chicago division; John J. Mantell, superintendent of terminals at Jersey City, N. J., has been appointed general superintendent of the lines east, vice Mr. Baldwin; Augustus E. Ruffer, superintendent of the Wyoming division at Dunmore, Pa., has been appointed superintendent of transportation, with headquarters at New York, vice George W. Kirtley, assigned to other duties; Henry O. Dunkle, general manager and assistant to president at Chicago, has been assigned to other duties as assistant to president at Chicago; Frederick B. Lincoln, general manager at New York, has been appointed superintendent of terminals, with headquarters at New York; John B. Dickson, general manager at Youngstown, Ohio, has been assigned to other duties; Edward

J. Edmunds, trainmaster of the Buffalo division at Buffalo, N. Y., has been appointed superintendent of the Wyoming division, with headquarters at Dunmore, Pa., succeeding A. E. Ruffer, and Harrison M. Mills has been appointed superintendent of Marion terminal, with headquarters at Marion, Ohio. The offices of the general manager at New York, Youngstown and Chicago, and of superintendent, Chicago division, have been abolished. Effective May 1.

Traffic

P. J. Brady has been appointed district passenger agent of the Union Pacific at New York City.

Edwin L. Lewis, whose appointment as assistant general passenger agent on the Philadelphia & Reading, with headquarters at Philadelphia, Pa., has already been announced in these columns, was born on September 17, 1882, at Lansford, Pa. He began railway work on March 12, 1903, with the Philadelphia & Reading as a clerk, and in June, 1906, was promoted to assistant chief clerk. On December 1, 1909, he was appointed district passenger agent at Philadelphia, Pa., which position he held at the time of his recent appointment as assistant general passenger agent of the same road, at Philadelphia, Pa., as above noted. Mr. Lewis' entire railway service has been with the Philadelphia & Reading.



E. L. Lewis

Ellis Farnsworth, whose appointment as assistant general passenger agent of the Missouri Pacific, with headquarters at Kansas City, Mo., was announced in these columns last week, received his early education at the Dalton (Ga.) high school, and later completed a course in a business college at Chattanooga, Tenn. He entered railway service on October 1, 1892, with the Missouri Pacific as a clerk in the office of the general southern agent at Chattanooga. After six years of service in this department, during which time he was given several minor promotions, he was appointed traveling passenger agent at Memphis, Tenn. Five years later he was transferred to Denver, Colo. In 1905 he was promoted to general agent, passenger department, at Chicago, Ill., which position he continued to fill up to the time of his present appointment, as noted above.



E. Farnsworth

B. M. Flippin, assistant general traffic manager of the Texas & Pacific, at New Orleans, La., has been appointed assistant freight traffic manager of the Missouri Pacific, with the same headquarters.

George Edward Schnitzer, whose appointment as assistant general freight agent of the Chicago, Rock Island & Pacific, with office at Little Rock, Ark., was noted in these columns two weeks ago, was born at Palmyra, Mo., on November 7, 1882. He entered railway service with the Chicago, Burlington & Quincy at St. Louis, Mo., in August, 1898, holding various minor positions

until made chief claim clerk in 1905. In February, 1906, he resigned to take charge of the claim department of the Wabash at St. Louis, but left this road in October, 1906, to go with the St. Louis Transfer Company, in charge of the reconsignment department. He returned to the Wabash in January, 1907, and was appointed superintendent of warehouses at St. Louis, resigning in November, 1907, to re-enter the employ of the St. Louis Transfer Company. In September, 1909, he went to the Chicago, Rock Island & Pacific, being assigned to the commercial office at St. Louis. In January, 1912, he was appointed chief clerk to the general agent with the same headquarters, being later promoted to chief clerk to the assistant freight traffic manager of that company. He now becomes assistant general freight agent, succeeding J. E. Johanson, resigned to accept service with another company.

Irving M. Griffin, assistant freight traffic manager of the Texas & Pacific, with office at Dallas, Tex., has been appointed freight traffic manager, with the same headquarters. He was born at



I. M. Griffin

Brownsville, Tenn., on August 6, 1875, and was educated at Mt. Lebanon University, Mt. Lebanon, La., later attending Howard Payne College, Brownwood, Tex. On September 1, 1893, he entered railway service with the International & Great Northern as a clerk in the local freight office at Palestine, Tex. From 1898 to 1899 he was chief clerk at Houston, Tex., and during 1899 and 1900 was soliciting freight agent, with the same headquarters. In 1901, he was appointed joint agent for the International & Great Northern, the Texas & Pacific, and the Missouri, Kansas & Texas at Mineola, Tex. In 1905 he was made city passenger, ticket and local freight agent for the International & Great Northern at Houston, and during 1907 and 1908 was joint agent for the latter road, the Missouri, Kansas & Texas, and the Galveston, Houston & Henderson at Galveston. During 1908 and 1909 he was general agent for the International & Great Northern at Galveston, and from 1909 to April 1, 1910, he was general cotton agent at Palestine, Tex., on the latter date also assuming the duties of division freight agent. On July 1, 1911, he was appointed assistant general freight agent of the Texas & Pacific at Dallas, and in December, 1913, was promoted to general freight agent. He was advanced to assistant freight traffic manager in May, 1916, which position he continued to fill up to the time of his present appointment, as noted above, became effective.

Engineering and Rolling Stock

A. R. Thompson has been appointed road foreman of engines of the Chesapeake & Ohio, with headquarters at Cane Fork, W. Va., vice D. S. Baals transferred.

D. E. Barton has been appointed acting superintendent of shops of the Atchison, Topeka & Santa Fe at Albuquerque, N. M., succeeding W. A. George, granted leave of absence.

C. J. Rist has been appointed division engineer of the Pere Marquette, at Saginaw, Mich., succeeding J. E. Johnson, resigned, to accept service with another company.

A. E. Pratt, signal supervisor of the Erie at Buffalo, N. Y., has been transferred to Marion, Ohio, as signal supervisor of the Kent division in place of F. Bridge, resigned.

Joseph F. Donellan has been appointed master mechanic of the Pennsylvania division of the Delaware & Hudson, with office at Carbondale, Pa., succeeding George S. Graham, resigned.

C. Hench, master carpenter of the Pennsylvania Railroad at Sunbury, Pa., has been appointed master carpenter of the Schuyl-

kill division, with headquarters at Reading, Pa., vice J. S. Wallace, promoted.

James Hall, master car repairer of the Southern Pacific, Coast division, with headquarters at San Francisco, Cal., has been appointed general foreman of passenger cars and repairs and construction at Sacramento.

Galen B. Owen has been appointed superintendent of maintenance of the Erie Railroad, and Milton A. Baird, chief signal inspector at Jersey City, has been appointed signal engineer. Both with headquarters at New York.

M. H. Doughty, assistant to chief engineer of the Delaware, Lackawanna & Western at Hoboken, N. J., has been appointed division engineer, with office at Hoboken, succeeding G. T. Hand, resigned to go to another company.

R. B. Robinson, engineer maintenance of way of the Oregon Short Line at Pocatello, Idaho, will in future have supervision over all signal department matters heretofore under the jurisdiction of the superintendent of transportation and telegraph.

R. N. Priest, a construction engineer on the Atchison, Topeka & Santa Fe, has been appointed division engineer at Arkansas City, Kan., succeeding H. J. Moore. L. M. Townsend, acting division engineer at Dodge City, Kan., has been appointed division engineer with the same headquarters, succeeding L. C. Graves. L. G. Harris, acting division engineer at La Junta, Colo., has been appointed division engineer at this point, succeeding Claude Betson. Irving Anderson, office engineer at Chicago, Ill., has been appointed acting division engineer at Marceline, Mo., succeeding W. C. Baisinger, transferred.

Harold Knight, signal engineer of the Erie at Jersey City, N. J., has been appointed assistant superintendent of maintenance, with headquarters at New York. Effective May 1. He was born on October 28, 1881, at Stockport Station, Delaware county, New York, and was educated at Sheffield Scientific School, Yale University. He began railway work in August, 1904, on the Erie, and, with the exception of a short time when he was with the Northern Central, at Elmira, N. Y., his entire railway service has been with the Erie. In 1904 he served as a rodman at Elmira on the Susquehanna division; the following year he was consecutively transitman and assistant engineer at Hornell, and in 1908 was appointed division engineer at Salamanca, on the Allegheny division. He was transferred in 1912 to Jersey City, N. J., as division engineer on the New York division, and in 1914 he was appointed signal engineer at Jersey City, of the Erie system, which position he held at the time of his recent appointment as assistant superintendent of maintenance, as above noted.

Purchasing

C. F. Ludington, chief fuel supervisor of the Atchison, Topeka & Santa Fe, at Topeka, Kan., has resigned to accept a similar position with the Missouri, Kansas & Texas, with headquarters at Parsons, Kan.

Special

J. E. Johanson, who resigned recently as general freight agent of the Chicago, Rock Island & Pacific with office at Little Rock, Ark., has been appointed a member of the rate committee of the Southwestern Tariff Committee at St. Louis, Mo.

OBITUARY

George Woolley Strattan, formerly from 1871 to 1906 master mechanic of the Pennsylvania Railroad, died on April 14, at Easton, Pa., at the age of 81.

Samuel S. Patterson, secretary emeritus of the American Railway Bridge & Building Association, died at Chicago on April 17 of pneumonia, after an illness of two days. Mr. Patterson was born at Hopkinson, N. H., on January 23, 1840, and began his railway career on the Concord & Montreal railroad. He was in charge of bridge and building work for this company and its successor, the Boston & Maine, for 45 years, retiring from active service a few years ago. He came before railway men most prominently through his long connection with the American Railway Bridge & Building Association, of which he was an organizer and its first secretary, serving for 17 years.

Equipment and Supplies

LOCOMOTIVES

THE ILLINOIS NORTHERN is contemplating the purchase of 2 switching locomotives.

THE CHICAGO, BURLINGTON & QUINCY is contemplating the purchase of 65 locomotives.

THE CENTRAL OF NEW JERSEY has ordered 6 Pacific type locomotives from the Baldwin Locomotive Works.

THE UNITED STATES GOVERNMENT has ordered one six-wheel locomotive from the Baldwin Locomotive Works.

THE COLORADO, WYOMING & EASTERN has ordered one Mikado locomotive from the Baldwin Locomotive Works.

THE KANAWHA, GLEN JEAN & EASTERN has ordered one Mikado locomotive from the Baldwin Locomotive Works.

THE CHICAGO & WESTERN INDIANA is seeking authority to purchase one Mogul and 4 eight-wheel switching locomotives.

THE LIHUE PLANT COMPANY, LTD. (Hawaii) has ordered one six-wheel locomotive from the Baldwin Locomotive Works.

THE UNITED STATES WAR DEPARTMENT has recently ordered an armored locomotive from the American Locomotive Company.

THE CUBAN-AMERICAN SUGAR COMPANY has ordered one Mogul type locomotive from the Baldwin Locomotive Works.

THE PONCE & GUAYAMA RAILROAD (Porto Rico) has ordered one Consolidation locomotive from the Baldwin Locomotive Works.

THE SOUTH DAKOTA SHORT LINE, Kimball, S. D., will come into the market shortly for several locomotives and a number of freight cars.

THE RUSSIAN GOVERNMENT recently ordered 53 narrow-gage Mallet type locomotives from the Baldwin Locomotive Works, and has since placed an order with that company for an additional 60 Decapod locomotives. Reports have it that 50 of this last order are the same 50 that were ordered some time ago from the Canadian Locomotive Company. It is also said that the Russian government is about to order an additional 300 Decapod locomotives.

THE BUFFALO, ROCHESTER & PITTSBURGH has ordered 16 Mallet, 5 Pacific and 4 eight-wheel switching locomotives from the American Locomotive Company. Of the 16 Mallet locomotives, 15 will have 23½ and 37 by 32-in. cylinders, and a total weight in working order of 429,000 lb.; the other Mallet locomotive will have 28 and 44 by 32-in. cylinders, and a total weight in working order of 548,000 lb. The Pacific type locomotives will have 24½ by 26-in. cylinders and a total weight in working order of 262,000 lb. The eight-wheel switching locomotives will have 24½ by 28-in. cylinders, and a total weight in working order of 230,000 lb.

FREIGHT CARS

THE ONETA OIL COMPANY is inquiring for 15 tank cars.

THE SOUTH DAKOTA SHORT LINE.—See item under locomotives.

THE COLORADO, WYOMING & EASTERN has withdrawn its inquiry for 200 car bodies.

THE LAKE TERMINAL is in the market for 94 hopper, 25 ore, 219 gondola and 25 flat cars.

THE BENWOOD & WHEELING CONNECTING is in the market for 40 hopper and 14 gondola cars.

THE MCKEESPORT CONNECTING is reported in the market for 30 hopper, 4 gondola and 12 flat cars.

THE PROCTOR & GAMBLE TRANSPORTATION COMPANY has ordered 60 tank cars from the American Car & Foundry Company.

THE WEST VIRGINIA PULP & PAPER COMPANY, New York, has ordered 50 tank cars from the American Car & Foundry Company.

THE J. G. WHITE ENGINEERING CORPORATION is reported in the market for 100 high side and 100 low side gondola cars, and 100 box cars for export to Portugal.

UNITED STATES WAR DEPARTMENT.—The American Car & Foundry Company is building at its Berwick, Pa., plant 12 armored cars for the War Department.

THE DULUTH & IRON RANGE has ordered ten complete Moore system refrigerator heater and ventilator cars from the Refrigerator Heater & Ventilator Car Company, St. Paul, Minn.

THE UNION RAILROAD divided its order for 500 gondola cars between the Ralston Steel Car Company and the Pressed Steel Car Company. In last week's issue it was incorrectly reported that the Standard Steel Car Company had received part of this order.

PASSENGER CARS

THE DELAWARE, LACKAWANNA & WESTERN is in the market for 2 combination library, buffet, lounging and baggage cars.

IRON AND STEEL

THE ANN ARBOR has issued an inquiry for 3,000 tons of rails for 1918 delivery.

THE NORTHERN PACIFIC has placed contracts for 40,000 tons of rails for 1918 delivery.

THE MISSOURI PACIFIC has ordered 286 tons of I-beam and girder spans from the American Bridge Company, to be erected at Omaha, Neb.

THE DULUTH & IRON RANGE has ordered 100 tons of steel from the American Bridge Company for the steel frame of a dock office, and for steel walks connecting same with number 1 ore dock, at Two Harbors, Minn.

COSTA RICAN RAILWAYS.—The total number of passengers carried by the Costa Rican railways in the year 1915 was 779,360, as compared with 855,954 in the year 1914. The total railway mileage in operation throughout Costa Rica, as of December 31, 1915, did not exceed 450 miles. Recent construction work has been confined to the various United Fruit Company lines, which extensions are built solely to meet the requirements of the banana trade.—*Commerce Report*.

AN OPERATING TEXT BOOK.—It is to be hoped that after the war a really authoritative text book on the use of railways in a modern campaign will be available. Such official compilations as exist are useful so far as they go, but, like many other military publications, they were produced some years ago, and even in their reprinted form are not abreast of the most up-to-date practice. It is obvious, for instance, that any innovation which increases the traffic capacity of a line, such as automatic signaling or electrification, will have an appreciable effect on military timetables, as regards both speed and the interval between trains. In this connection it is important to bear in mind that military schedules are framed on a very rigid basis, and are not in practice supposed to be altered save for unavoidable reasons. Another innovation of distinct military value is the train control system [telephonic control by a central office over division and terminal train activities] in its various forms. Again, the composition of military trains is based on the average capacity of standard passenger and goods vehicles, and on the hauling power of standard locomotives. It follows that locomotive and rolling-stock developments call for the constant revision of the figures on which the composition of military trains is based. The time taken to entrain and detrain various loads is another very important military factor, and here again such modern appliances as electric cranes have to be considered. An enormous amount of practical experience is being gained daily by our railway transport officers—in France alone a great system of purely military railways has been created behind the Front—and plenty of valuable material should already be available for such an operating text book as we have in mind.—*Railway Gazette*, London.

Supply Trade News

B. John Buell, formerly with the Spencer Otis Company of Chicago, has been appointed general manager of the Reading Specialties Company, Reading, Pa.

The Pullman Company on May 1 will move its New York offices from the Mills building, 15 Broad street, to room 2612 in the Adams Express building at 61 Broadway.

J. M. Borrowdale, formerly superintendent of car construction for the Illinois Central, with office at Chicago, Ill., has been appointed car specialty representative of the general railroad department of the H. W. Johns-Manville Company, Chicago.

A. Fletcher Marsh, secretary of the Marsh & Truman Lumber Company, Chicago, has been appointed captain of the Quartermasters' Officers' Reserve Corps, Central Department, United States Army, for service in connection with transportation. His headquarters for the present are at Chicago.

The Louisville Car & Foundry Company, Louisville, Ky., will soon increase its capital stock to \$60,000 and engage in the building of tank cars, besides rebuilding and general repairing of railway equipment. The officers of the new company are Charles Schimpeler, president; C. H. Schimpeler, vice-president, and Henry Schimpeler, secretary.

R. S. Charles, formerly engineer maintenance of way of the Wabash at Montpelier, Ohio, has resigned to become associated with the Layne & Bowler Company, Memphis, Tenn., water supply contractors. He will have charge of all field operations, the development of ground water supplies and the installation of pumping machinery for irrigation and industrial purposes.

James A. Farrell, chairman of the National Foreign Trade Council, announces that Robert H. Patchin has resigned as secretary of the council to become manager of the foreign trade department of W. R. Grace & Co., and that Oscar King Davis has been appointed secretary. Mr. Davis has been Washington and foreign correspondent of New York newspapers.

The Rome Merchant Iron Mill, of Rome, N. Y., has been reincorporated under the name of Rome Iron Mills, Inc. This change was made to provide for an increased capitalization necessitated by a large increase in facilities for the manufacture of hollow staybolt iron. There has been no change in the management. Staybolt iron formed hollow without drilling has some well recognized advantages. The Rome Iron Mills, Inc., has been for some time making a hollow iron of its "Superior" quality which is in use on a number of railroads.

The United States Circuit Court of Appeals for the Seventh Circuit, rendered a decision on April 10, holding that the Ajax rail anchor infringed on the Kramer patents of the P & M Company. This decision was rendered on an appeal from a ruling of the District Court of the Northern District of Illinois, Eastern Division, dismissing the suit for infringement brought by the P & M Company against the Ajax Rail Anchor Company. The P & M Company maintained that the Elfborg patents under which the Ajax rail anchor was being made infringed on the Kramer patent issued in 1912. The recent decision of the Circuit Court of Appeals stated that the fundamental features of the Kramer patent are employed in the Ajax anchor in order to obtain the same objects and that the material reduction in the amount of metal required in the Ajax anchor does not save it from the charge of infringement.

Robert W. Hunt & Co. has offered the services of its entire bureau of inspection, tests and consultation to the government at actual cost in a letter to the Secretary of War dated April 20. This includes all of the 700 employees in the main office at Chicago and in the branch offices and laboratories in New York City, Pittsburgh, St. Louis, San Francisco, Montreal and London. This offer is made in the belief that this large and highly specialized organization can be of service to the country in a particularly practical manner at less cost to the country than equivalent services can be obtained otherwise. The acceptance of this proposal will relieve government officers from

inspection duties for services of greater value in other directions, and will enable the government to utilize this organization intact without the necessity of gathering together other men into a similar organization which it would take time to develop. In addition to its work for many of the railways and other large private corporations, this company is now and has been performing inspection work for the British, Russian, Italian, Netherlands and French governments, not only on munition orders, but also on steel rails and their fastenings and other railway equipment.

Thomas Dunbar, Sr., whose election as president of the Acme Supply Company, Chicago, Ill., was announced in these columns last week, has been connected with the railway supply field since

1885. He entered the service of the Pullman Company as a car builder and was later a template maker. In 1893, he was promoted to general foreman, and in 1902 became superintendent. Two years later he was advanced to manager of the works of this company and in 1910 was appointed manager of the mechanical department. He resigned this latter connection in April, 1916, and spent the interval between his resignation and present election recuperating on his ranch in Arizona. He succeeds H. H. Schroyer, retired.



T. Dunbar, Sr.

U. S. Steel Corporation Declares Three Per Cent Extra Dividend

Directors of the United States Steel Corporation at their meeting last Tuesday declared an extra dividend of 3 per cent on the common stock and the regular dividends of $1\frac{1}{4}$ per cent on the common and $1\frac{3}{4}$ per cent on the preferred stock.

The quarterly statement showed a balance available for dividends of \$97,744,756. Deducting the preferred dividends of \$6,304,919 left a balance available for the common of \$91,439,837, or not quite \$18 a share. This is at the rate of \$72 a share annually. The balance carried to surplus after all charges was \$69,836,981.

Interchange Car Inspectors' and Car Foremen's Supply Men's Association

During the past few years numerous manufacturers of railway supplies and appliances have arranged exhibits at the time of the annual conventions of the Chief Interchange Car Inspectors' and Car Foremen's Association. In order to facilitate the work for the companies desiring to make exhibits at that time, a permanent organization has been formed which will be known as the Interchange Car Inspectors' and Car Foremen's Supply Men's Association. At a meeting held at the Hotel La Salle, Chicago, on April 9, a constitution and by-laws were drawn up and the following officers were elected: President, L. S. Wright, National Malleable Castings Company; first vice-president, C. D. Derby, Joyce-Cridland Company; second vice-president, W. G. Willcoxson, Boss Nut Company; secretary, D. B. Wright, the Lehon Company; treasurer, J. R. Mitchell, with W. H. Miner. The executive committee of the association is to be made up of nine representatives of supply companies, three to be elected each year for a term of three years, and the secretary of the Chief Interchange Car Inspectors' and Car Foremen's Association. The following were elected members of the executive committee for three years: W. G. Wallace, American Steel Foundries; C. N. Thulin, Duff Manufacturing Company; D. B. Sissons, Imperial Appliance Company. The members elected for two years are: C. J. W. Clasen, the Bettendorf Company; C. J. Wymer, the Grip Nut Company; W. H. Pratt, Heath & Milligan; and the following were elected for one year: A. H. Beatty, Templeton-Kenly & Co.; J. E. Tareton, Union Draft Gear Company; D. F. Jennings, of Guilford S. Wood.

Railway Construction

BUFFALO, ROCHESTER & PITTSBURGH.—This company has given a contract to Westinghouse Church Kerr & Co., New York, for improvements to be made at East Salamanca, N. Y., to cost \$500,000. This work includes erection of machine and erecting shops, transfer table, blacksmith shop and storehouse; the offices will also be remodeled. (March 9, p. 426.)

The Buffalo, Rochester & Pittsburgh has plans under way for a new passenger and a freight station of brick construction at Mt. Jewett, Pa. The passenger station will be located on the site of the old one and the freight station just south of the passenger station. The general plans include the usual landscape gardening, and the work will cost about \$35,000.

The Buffalo, Rochester & Pittsburgh expects to start work soon on the construction of a combined freight and passenger station at West Falls, N. Y. The new station will be located on the site of the old one which was destroyed by fire.

CHICAGO & NORTH WESTERN.—This company has awarded contracts to Gaffin & Gehri, Fond du Lac, Wis., for the replacement of about 20 wooden bridges on the Wisconsin, Lake Shore, Ashland and Peninsula divisions with steel and cement structures.

DICKINSON & NORTHWESTERN.—Articles of incorporation have been granted to this company by the state of North Dakota for the construction of a railroad to extend north and west of Dickinson, a distance of about 40 miles. W. L. Richards, of the above town, is one of the incorporators.

DU QUOIN, CHRISTOPHER & EASTERN (ELECTRIC).—This company has been incorporated to construct an interurban line from Du Quoin, Perry county, Ill., in an easterly direction to West Frankfort, and from Du Quoin southerly to Carbondale in Jackson county. James Forester, president; George W. Dowell, secretary and general counsel, and W. R. Hayes, treasurer, all of Du Quoin, Ill.

ERIE RAILROAD.—Contracts have been let to the Peckham Construction Company for the superstructure, and to the Eastern Concrete Steel Company, for the sub-structure of a steel viaduct, to be built at Louisiana street, Buffalo. This improvement will eliminate a grade crossing of the Erie Railroad. (March 9, p. 426.)

FLORIDA ROADS.—The Tamiami Trail Corporation has secured a right of way for a railroad, it is said, to be built from Miami, Fla., west on the north bank of the Tamiami Trail canal to the northeast corner of Monroe county, thence southwest to Chevelier bay, about 68 miles. J. F. Jaudon, Miami, is interested.

ILLINOIS CENTRAL.—This company has recently made surveys for proposed grade reduction work at Sullivan, Ind., and is now preparing plans and estimates for the work. No decision has been arrived at as to when it will be undertaken.

The Illinois Central has under consideration the construction of a viaduct just north of its passenger depot at McComb, Miss. No definite decision has as yet been reached as to how soon the work will be done. The cost of the project is estimated at \$20,000.

OREGON ELECTRIC.—This company has awarded a contract to Grant Smith & Co., Portland, Ore., for the erection of trestle approaches to the bridge over the Willamette river at Wilsonville, Ore. The trestle will be 2,600 ft. in length, and will cost approximately \$60,000. Work will be begun immediately.

PENNSYLVANIA LINES WEST.—This company is completing negotiations for its entry into Detroit, Mich. It will probably call for bids for the masonry and grading from Carleton to Detroit, in about 60 days. The grading will be very light, and there are no large bridges to be built.

SOUTH DAKOTA SHORT LINE.—This is the name of a line which will be constructed from Platte, S. D., to Pierre, a distance of about 125 miles. It is expected to build 25 miles at once. The grading will average 20,000 cu. yd. to the mile. There will be several small bridges, approximately 200 ft. in length each. George W. Adams, Kimball, S. D.

Railway Financial News

BOSTON & MAINE.—The New Hampshire senate has passed a bill providing for the reorganization of the Boston & Maine along the lines suggested by the directors. The vote was 19 to 3. The lower house passed the measure last week without roll-call.

Judge Morton, in the United States District Court, has handed down an opinion instructing James H. Hustis, temporary receiver, to pay the interest on \$2,000,000 of notes of the Connecticut River, one of the Boston & Maine's leased lines. The court did not decide as to the validity of the notes in question.

CHICAGO, ROCK ISLAND & PACIFIC.—The Bankers Trust Company won a point in the suit to recover \$21,560,513 from the Chicago, Rock Island & Pacific. The Appellate Division of the New York Supreme Court reversed the lower courts, which had granted a temporary injunction to Henry I. Clark and other preferred stockholders of the Keokuk & Des Moines in their action against the trust company. The stockholders had brought the suit against the Keokuk & Des Moines, which is a subsidiary of the Rock Island, on the ground that the Rock Island had failed to pay the rental of the road and that if the Rock Island road's property was sold under the foreclosure decree of the United States Court, the Keokuk & Des Moines stockholders would be unable to realize on their claims. The Bankers Trust Company, as trustee, secured a judgment for \$21,560,513, representing the capital and interest of \$20,000,000 of Keokuk & Des Moines Company stock and has been trying to force its collection through the courts ever since.

CINCINNATI, HAMILTON & DAYTON.—The United States District Court at Cincinnati has ordered this road to be sold at auction. This company has been in the hands of receivers since July, 1914, and has an outstanding debt of nearly \$50,000,000. E. W. Strong has been named special master to conduct the sale, which is to take place at Dayton in early June. The upset price fixed by court is \$4,725,000.

COLORADO & MIDLAND.—This road has been sold at foreclosure for the price of \$1,425,000.

CONNECTICUT RIVER.—(See Boston & Maine.)

KEOKUK & DES MOINES.—(See Chicago, Rock Island & Pacific.)

TEXAS & PACIFIC.—George J. Gould, president and chairman of the board of directors, has resigned these positions. He will remain a director of the company and his son, Kingdon Gould, will retain the vice-presidency. William Church Osborn will become chairman of the board, and J. L. Lancaster, receiver of the road, will become president. The executive committee will consist of Mr. Osborn, Kingdon Gould, Dunlevy Milbank, Norman S. Meldrum and Finley J. Shepard.

TRACKWALKING EXTRA HAZARDOUS.—Walking along railroad tracks has long been an extra-hazardous method of pedestrianism and also a forbidden method, but it goes on just the same. An additional danger has now been added where soldiers are posted by the tracks. If you miss being crushed by a train you may still be shot by a soldier. Probably those who like to be a bit sporty in their walking will now find the use of railroad tracks as a public highway doubly fascinating.—*Hartford Courant.*

DEVELOPMENT WORK OF RUSSIAN RAILWAY.—The Russian railways are following the example of the American lines in their efforts to encourage agricultural pursuits. Recently an agricultural train fully equipped with various kinds of agricultural machinery and implements, reading matter, samples of grain that have been prize winners, lecture rooms, etc., was sent down the line of the Vladikavkas Railway, remaining at least one day at each station. To attract attention to the territory served by the line the railroad also maintains a commercial agency at Novorossisk.

ANNUAL REPORTS

THE NEW YORK CENTRAL RAILROAD COMPANY

To the Stockholders of

THE NEW YORK CENTRAL RAILROAD COMPANY:

The Board of Directors herewith submits its report for the year ended December 31, 1916, with statements showing the results for the year and the financial condition of the company.

The mileage covered by the report is as follows:

	Miles
Main line and branches owned.....	3,699.53
Proprietary line .....	.18
Leased line	1,527.07
Line operated under contract.....	3.70
Line operated under trackage rights.....	458.31

Total road operated..... 5,688.79

an increase of 48.56 miles over the mileage reported December 31, 1915. The increases are due to the inclusion in this report of the mileage of the Ottawa and New York Railway and to minor changes due to revision of line. Changes in line operated under trackage rights are the result of a careful revision of measurements by the owning companies, reclassification of previously reported mileage and the discontinuance of operation over the Pennsylvania Railroad from Irvona to Amsbury in May, 1916.

SUMMARY OF FINANCIAL OPERATIONS AFFECTING INCOME

OPERATING INCOME	1916	1915	INCREASE OR DECREASE
RAILWAY OPERATIONS	*5,688.79	*5,640.23	48.56 miles
Revenues	\$201,585,048.68	\$167,912,333.33	\$33,672,715.35
Expenses	129,738,369.19	109,394,344.71	20,344,024.48
NET REVENUE FROM RAILWAY OPERATIONS	\$71,846,679.49	\$58,517,988.62	\$13,328,690.87
Percentage of expenses to revenues	(64.36)	(65.15)	—(0.79)
Railway taxes accrued.....	\$8,481,549.11	\$8,324,325.75	\$157,223.36
Uncollectible railway revenues	17,906.84	14,927.30	2,979.54
RAILWAY OPERATING INCOME	\$63,347,223.54	\$50,178,735.57	\$13,168,487.97
MISCELLANEOUS OPERATIONS			
Revenues	\$1,758.59	\$6,431.21	—\$4,672.62
Expenses and taxes.....	4,964.80	4,709.24	255.56
NET REVENUE FROM MISCELLANEOUS OPERATIONS	†\$3,206.21	\$1,721.97	—\$4,928.18
TOTAL OPERATING INCOME.	\$63,344,017.33	\$50,180,457.54	\$13,163,559.79
OTHER INCOME			
Hire of equipment—credit balance		\$72,702.33	—\$72,702.33
Joint facility rent income.....	\$3,079,952.01	2,829,886.90	250,065.11
Income from lease of road.....	115,554.49	77,098.04	38,456.45
Miscellaneous rent income.....	666,998.86	680,464.11	—13,465.25
Miscellaneous non-operating physical property	515,630.71	409,772.58	105,858.13
Separately operated properties—profit	4,350,787.35	1,875,607.91	2,475,179.44
Dividend income	11,099,697.29	6,961,515.79	4,138,181.50
Income from funded securities	476,467.36	680,893.00	—204,425.64
Income from unfunded securities and accounts.....	2,235,811.67	2,969,132.41	—733,320.74
Miscellaneous income	82,529.27	71,798.15	10,731.12
TOTAL OTHER INCOME.....	\$22,623,429.01	\$16,628,871.22	\$5,994,557.79
GROSS INCOME	\$85,967,446.34	\$66,809,328.76	\$19,158,117.58
DEDUCTIONS FROM GROSS INCOME			
Hire of equipment—debit balance	\$2,200,651.72		\$2,200,651.72
Joint facility rents.....	1,147,576.27	\$1,094,610.77	52,965.50
Miscellaneous rents	678,978.39	699,334.09	—20,355.70
Miscellaneous tax accruals.....	116,557.81	67,420.69	49,137.12
Rent for leased roads.....	6,354,580.50	6,270,647.88	83,932.62
Interest on funded debt.....	28,871,299.62	27,073,097.21	1,798,202.41
Interest on unfunded debt.....	617,035.95	3,565,747.16	—2,948,711.21
Amortization of discount on funded debt	255,816.00	194,799.00	61,017.00
Maintenance of investment organization	2,674.70	7,489.13	—4,814.43
Income transferred to other companies		46,470.34	—46,470.34
Other deductions	63,057.98	78,238.90	—15,180.92

TOTAL DEDUCTIONS FROM

GROSS INCOME	\$40,308,228.94	\$39,097,855.17	\$1,210,373.77
NET CORPORATE INCOME....	\$45,659,217.40	\$27,711,473.59	\$17,947,743.81

DISPOSITION OF NET INCOME

Dividends declared—5 per cent	\$12,466,611.25	\$12,466,483.75	\$127.50
To equipment depreciation account	2,500,000.00		2,500,000.00
SURPLUS FOR THE YEAR CARRIED TO PROFIT AND LOSS.....	\$30,692,606.15	\$15,244,989.84	\$15,447,616.31

* Miles operated.
† Deficit.

The New York Central Railroad Company
Profit and loss account

Balance to credit of profit and loss (free surplus) on December 31, 1915..... \$37,406,473.66

Additions:

Surplus for the year 1916.....	\$30,692,606.15	
Sundry deferred credits and adjustments.....	541,195.01	31,233,801.16
		\$68,640,274.82

Deductions:

Depreciation prior to 1907 on equipment retired during 1916.....	\$1,566,064.92	
Adjustment of accounts with Pullman Company	187,586.93	
Cancellation of loan to New Jersey Junction Railroad Company	113,659.68	
Adjustments account of lease of St. Lawrence & Adirondack Railway and Ottawa and New York Railway	685,191.92	
Cash advances to Clearfield Bituminous Coal Corporation	272,860.40	
Abandoned property	227,774.18	
Charging off various uncollectible accounts and sundry adjustments of accounts.....	304,202.43	3,357,340.46

BALANCE TO CREDIT OF PROFIT AND LOSS (FREE SURPLUS)

DECEMBER 31, 1916..... \$65,282,934.36

On October 19, 1916, the Board of Directors authorized the execution of an agreement to be dated January 1, 1917, for the establishment of the New York Central Railroad Equipment Trust of 1917, providing for an issue of \$19,995,000 of equipment trust certificates, bearing interest at the rate of 4½% per annum, which amount is not to be in excess of 80% of the cost of the equipment to be furnished under the terms of said agreement. The certificates are to be paid in fifteen annual installments, the first being due January 1, 1918. Of the said certificates, the Board on October 19, 1916, authorized the sale of \$12,000,000.

With the permission of the Public Service Commission of the Second District of the State of New York, this company has acquired the entire capital stock of the Dolgeville & Salisbury Railway Company, and on January 15, 1917, merged that Company with itself.

This company had been operating, as agent, the property of the Fulton Chain Railway Company under agreement dated May 29, 1901, and the property of the Raquette Lake Railway Company under agreement dated January 1, 1901. The Board of Directors of the New York Central Railroad Company offered to accept, as of July 1, 1916, all the capital stock and bonds of the Fulton Chain Railway Company and the Raquette Lake Railway Company, provided those two companies first secured the satisfaction of all debts and claims against them, other than the mortgage bonds above mentioned, owing to any persons or companies other than The New York Central Railroad Company, and upon such transfer to cancel the indebtedness of the Raquette Lake Railway Company to it. This offer was accepted by the owners of the stocks and bonds of the two railway companies and a petition dated September 15, 1916, was presented to the Public Service Commission of the State of New York for its approval to the transfer of the securities mentioned and the cancellation of the indebtedness of the Raquette Lake Railway Company.

The funded debt of the company as reported at the beginning of the year was..... \$681,240,153.01

It has been reduced during the year as follows:

Norwood and Montreal Railroad Company	
First mortgage bonds, matured April 1, 1916	\$130,000.00
Balance of note to New York, New Haven & Hartford Railroad Company.....	1,100,400.00
Principal of mortgages on real estate in the city of New York, due May 1, 1923.....	2,000,000.00
Payments falling due during the year and on January 1, 1917, on the company's liability for certificates issued under equipment trust agreements as follows:	
Trust of 1907, installment due November, 1916	1,492,884.75
Trust of 1910, installment due January, 1917	1,406,413.74

Trust of 1912, installment due January, 1917	688,398.90
Trust of 1913, installment due January, 1917	759,581.80
Boston & Albany trust of 1912, installment due October, 1916	500,000.00
Transfer of trust locomotives to the Michigan Central Railroad Company	233,466.44
a total decrease of	8,311,145.63
leaving the funded debt on December 31, 1916, at	\$672,929,007.38

Consolidation mortgage bonds, series A, bearing interest at the rate of 4 per cent per annum, aggregating \$65,238,000, were substituted for a like amount of N Y C & H R R R Co-Lake Shore Collateral gold bonds, bearing interest at the rate of 3½ per cent per annum, under the authority to issue \$70,000,000 of Consolidation mortgage bonds to the holders of Lake Shore Collateral bonds who consented to the consolidation of 1914.

In July the company sold its holdings, amounting to a par value of \$15,018,000 of the capital stock of The New York Chicago & St. Louis Railroad Company, which had been carried on the books at a valuation of \$8,447,746.94, for \$8,500,000, of which \$2,000,000 was in the form of cash and \$6,500,000 in the form of notes given by the purchasers.

In the operation of the Pension Department 251 employees were retired and placed upon the pension roll. Of these retirements 157 were authorized because of the attainment of seventy years of age, and 94 because of total and permanent physical disability; 170 pensioners died during 1916, and at the close of the year, 1,474 retired employees were carried upon the pension rolls. The average monthly pension allowance of these employees was \$24.75, and the total amount paid in pension allowances during the year was \$425,938.55.

The year 1916 was remarkable in many ways. The extraordinary business pressure growing out of the demand for munitions, foodstuffs and other materials for export produced the largest traffic in the history of the road. For a part of the year this growth in traffic was profitable because the plant was adequate in condition and capacity. With the congestion of terminals which later developed, however, together with many changes in the markets reached by various productions upon our line, we arrived at a point where additional business was sometimes unprofitable because efficiency involved a dispatch of business and a co-operation by patrons that did not develop ratably with the demand for transportation.

The causes for this are, essentially, beyond the company's control. They are a function of the changes in markets, supply and demand, prices and

the commerce of the times. In other words, we were adapted in plant and equipment to the maximum expectation of business as manifested heretofore, and your property was developing currently with the indications of normal business growth. Furthermore, large investments in equipment have been made with which to meet the crisis as far as equipment applies. Equipment, however, is not the limiting factor so much as the facilities for the use of the equipment and the prompt co-operation of shippers and consignees in relieving the company from protracted and costly custody of traffic.

The impressive fact is, therefore, that for additional growth of traffic beyond that witnessed during the year 1916, there are required in many places large investments in terminals and other facilities that will need extensive financial provision when reached.

In view of the wide publicity given to the subject by the press of the country it will suffice to state briefly that the eight-hour legislation passed on September 2, 1916, by Congress, in order to avert the threatened blow to the country, has, during the time this report was in process of compilation, been declared by the Supreme Court of the United States to be a competent exercise of the power delegated to Congress to regulate commerce between States. Furthermore, this decision arrived with the conclusion of a mediation between the railroads and the train service employees by a Commission appointed by the President for the emergency, consisting of the Secretary of the Interior, the Secretary of Labor, the President of the American Federation of Labor and the President of the Baltimore and Ohio Railroad, Chairman of the Advisory Commission to the Council of National Defence.

The mediation was made in the light of representations from the President that a national crisis impended, not only in respect of the threatened strike, but also in respect of foreign relations, in which hour he could not tolerate the thought of a disturbance of domestic affairs. The appeal led the Railroad Presidents to give full power to the Mediation Board to effect a settlement of the controversy. This settlement conceded all the important demands of the employees with the exception of punitive overtime.

The act of the Government through the Commission, as well as through the decision of the Supreme Court, has therefore fixed a responsibility in the Government for wages and conditions of employment which has heretofore not been assumed, although for many years the Government had assumed the control of revenues. The decision of the Supreme Court is reassuring in respect of the declaration that concerted acts to interrupt the operations of railways are intolerant to the spirit of the laws.

While, therefore, new burdens and problems are thrown upon the railway managements in order to meet the costs and complications which these matters have added, as well as the increased cost of fuel and supplies, the situation calls for renewed efforts toward increased efficiency and prompt and thorough presentation of the need for additional revenue through rate

CONDENSED GENERAL BALANCE SHEET, DECEMBER 31, 1916

ASSETS			LIABILITIES		
INVESTMENTS			STOCK		
Investment in road	\$446,635,867.57		Capital stock		\$249,590,460.00
Investment in equipment:			LONG TERM DEBT		
Trust	\$82,087,109.63		Funded debt unmatured:		
Other	136,044,773.65	218,131,883.28	Equipment obligations ..	\$40,948,007.38	
			Mortgage bonds	526,481,000.00	
Improvements on leased railway property		88,395,157.57	Debentures	105,500,000.00	\$672,929,007.38
Miscellaneous physical property		7,998,204.36			
Investments in affiliated companies:			Non-negotiable debt to affiliated companies	153,209.44	673,082,216.82
Stocks	\$131,908,215.95				
Bonds	8,004,609.26		CURRENT LIABILITIES		
Notes	40,374,854.99		Loans and bills payable	\$4,502,450.00	
Advances	11,071,916.50		Traffic and car-service balances payable	4,492,351.94	
Miscellaneous	1,770,000.00	193,129,596.70	Audited accounts and wages payable ..	14,945,132.05	
Other investments:			Interest matured unpaid:		
Stocks	\$31,128,151.30		Matured, payable January		
Bonds	2,099,660.87		1, 1917	\$2,820,359.41	
Notes	10,180,026.03		Interest unclaimed	47,835.85	2,868,195.26
Advances	20.33				
Miscellaneous	12,850.00	43,420,708.53	Dividend declared, payable February 1,		
			1917	3,116,657.50	
TOTAL INVESTMENTS		\$997,711,418.01	Dividends matured unclaimed	164,795.33	
CURRENT ASSETS			Funded debt matured unpaid	7,790.00	
Cash	\$13,718,520.75		Unmatured interest accrued	5,257,496.45	
Special deposits	619,915.71		Unmatured rents accrued	803,816.21	
Loans and bills receivable	22,451.10		Other current liabilities	5,181,087.40	41,339,772.14
Traffic and car-service balances receivable	4,042,808.64				
Net balance due from agents and con-			UNADJUSTED CREDITS		
ductors	7,929,209.10		Tax liability	\$944,319.62	
Miscellaneous accounts receivable	13,183,074.35		Insurance and casualty reserves	313,561.14	
Material and supplies	20,341,321.13		Operating reserves	362,421.51	
Interest and dividends receivable	3,098,666.62		Accrued depreciation of equipment	27,638,046.20	
Rents receivable	16,126.76		Liability to lessor companies for securities		
Other current assets	421,499.08	63,393,593.24	acquired (per contra)	471,351.00	
			Other unadjusted credits	2,363,931.60	32,093,631.07
DEFERRED ASSETS					
Working fund advances	\$198,349.32		DEFERRED LIABILITIES		
Insurance and other funds	505,498.70		Liability to lessor companies for equip-		
Other deferred assets	4,521,463.92	5,225,311.94	ment	\$15,050,191.86	
			Miscellaneous	603,817.85	15,654,009.71
UNADJUSTED DEBITS					
Rents and insurance premiums paid in			CORPORATE SURPLUS		
advance	\$82,920.85		Additions to property through income		
Discount on funded debt unamortized ..	6,652,500.97		and surplus	\$62,530.81	
Other unadjusted debits	3,853,313.04		Sinking fund reserves	296,854.14	
Securities issued or assumed—unpledged.	12,000.00				
Securities acquired from lessor companies			Total appropriated surplus	\$359,384.95	
(per contra)	471,351.00	11,072,085.86	Profit and loss—balance	65,282,934.36	65,642,319.31
		\$1,077,402,409.05			\$1,077,402,409.05

increases. This condition is so obvious and prevalent and so generally recognized by the public and their representatives, as to warrant the hope that the railroads will be permitted additional revenue through rate increases without delay, not only to help them pay the higher costs of labor, fuel and supplies, but to favor their credit in respect to the need of plant enlargement. Toward the realization of this hope it may be said that applications have been and are being made to the proper authorities to sanction the increases, not only on the ground of the increased cost of the things the railroad has to buy, but the increased value of the service rendered to the traffic conveyed.

The postal compensation has been changed from a weight to a space basis. The current pay is now a provisional rate fixed by the Interstate Commerce Commission under the Act with a view to collecting statistics as to the experience under this method of pay in the near future. The decision rests with the Interstate Commerce Commission and not with the Post Office Department as heretofore.

On the suggestion of the President of the United States, Congress has appointed a joint commission to inquire into the railroad situation. It has asked for evidence on the various subjects attempted to be regulated through the country, including the relation of one State regulation to the other and

all of them to the Federal regulation, the issue of securities, various police regulations, wage and employment conditions, control of rates, scope of incorporation, and possibilities of Government ownership. At least the desire to hear the case of the railroads along the broad lines of inquiry announced by the Commission is encouraging. What is needed most of all is a sense of conviction in the minds of the people of the real facts of the case, that the railroads are an instrumentality with the debit of obligations for wages, materials, fuel, taxes, and plant, and the credit of earnings for service performed; that, broadly speaking, they will thrive and be efficient as their means are ample, and that they welcome equitable regulation.

Because of the unusual demand for labor and the high prices offered by industries there has been difficulty in keeping full forces at shops, terminals and maintenance work, and there have been sporadic interruptions, which had to be remedied locally. It is not surprising, however, that the conditions and times have had such effect, but rather gratifying that we have cause to acknowledge the services rendered under these trying conditions by the officers and employees of the company, to whom thanks are hereby accorded.

For the Board of Directors,
ALFRED H. SMITH,
President.

THE MICHIGAN CENTRAL RAILROAD COMPANY—SEVENTY-FIRST ANNUAL REPORT

To the Stockholders of

THE MICHIGAN CENTRAL RAILROAD COMPANY:

The Board of Directors herewith submits its report for the year ended December 31, 1916, with statements showing the results for the year and the financial condition of the company.

The report covers the operation of mileage, as follows:

	Miles
Main line and branches owned.....	1,182.84
Line jointly owned .....	.71
Leased lines	578.16
Lines operated under trackage rights.....	100.06

Total road operated (as shown in detail on another page). 1,861.77

During the year this company acquired by purchase the railroad and other property of the following companies, subject to the lien of existing mortgages.

COMPANY	ROAD	Miles
Bay City & Battle Creek Railway	West Bay City to Midland, Michigan	18.18
Detroit & Bay City Railroad	Detroit to Bay City, Michigan and branches.....	166.72
Detroit & Charlevoix Railroad	Frederic to East Jordan, Michigan	42.66
Detroit Belt Line Railroad	City of Detroit, Michigan...	6.35
Detroit Delray & Dearborn Railroad	Delray to Dearborn, Michigan and branches.....	8.99
Grand River Valley Railroad	Rives Junction to Grand Rapids, Michigan	83.82
Jackson Lansing & Saginaw Railroad	Jackson to Mackinaw City, Mich. and branches.....	370.04
Kalamazoo & South Haven Railroad	Kalamazoo to South Haven, Michigan	39.34
Michigan Air Line Railroad	Jackson, Michigan to South Bend, Indiana	115.25
Toledo Canada Southern & Detroit Ry	Detroit, Michigan to Toledo, Ohio	59.22
	Total	910.57

The acquisition of these properties added to the mileage owned 910.57 miles, and increased the miles of road operated 42.66 miles, which, with certain reclassifications, remeasurements and small extensions resulted in a total increase in road operated over 1915 of 58.77 miles.

The capital stock of the several companies mentioned, owned by The Michigan Central Railroad Company, or acquired in connection with the purchase of their properties, will be cancelled as soon as all legal formalities have been completed. As a result of the merger there has been an increase in the company's investment in road and equipment of \$21,989,566.70, and in its bonded indebtedness of \$3,149,000.00.

There was no change in capital stock during the year, the amount authorized and outstanding being \$18,738,000.00.

The funded debt outstanding December 31, 1915, was \$47,384,719.61

It has been increased during the year by:

Bonds of Toledo, Canada Southern and Detroit Railway Company assumed.....	\$3,100,000.00
Bonds of Bay City and Battle Creek Railway Company assumed	49,000.00
Certificates issued under the Michigan Central Railroad equipment trust agreement of 1915....	4,500,000.00
Additional liability for certificates outstanding under 1910 trust, account transfer of 15 locomotives from The New York Central Railroad Company	233,466.44
	7,882,466.44
	\$55,267,186.05

It has been decreased during the year by:

Payment of pro-rata of installments on account of equipment trust certificates	
Trust of 1907, due November 1916 (N.Y.C. Lines)	\$260,425.45
Trust of 1910, due January 1917 " "	393,960.44
Trust of 1912, due January 1917 " "	151,710.90
Trust of 1913, due January 1917 " "	244,895.34
Trust of 1915, due October 1916 (M.C.R.R.)	300,000.00
	\$1,350,992.13
Michigan Central-Jackson, Lansing, and Saginaw 3½% first mortgage gold bonds of 1911 purchased and cancelled by the Trustees of the Land Grant Fund of the Jackson, Lansing & Saginaw Railroad Company	1,000.00
	1,351,992.13

Total funded debt December 31, 1916 (detail on another page) \$53,915,193.92

On December 13, 1916, the Board of Directors authorized, and the stockholders, at a meeting called to be held on February 7, 1917, will be requested to consent to, the execution of a refunding and improvement mortgage, to be dated January 1, 1917, to secure the company's now outstanding Debentures of 1909, amounting to \$7,634,000.00, and to secure, equally and ratably with the Debentures, bonds to be issued under the mortgage to an amount not exceeding \$100,000,000.00. By the terms of the proposed mortgage, the Board of Directors is given the power to authorize the issue of bonds, in series, maturing on such dates, not later than January 1, 2017, and bearing interest at such rates, as shall be fixed and determined by the Board, for the purposes specified in the mortgage; and it is provided that when the amount issued for purposes other than the refunding of Debentures or of prior debt shall be \$10,000,000.00 no additional amount of bonds shall be issued in respect of work done or of property acquired, in any amount exceeding 70%, of the cost of such work or property.

Certificates issued under the agreement dated October 1, 1915, establishing the Michigan Central Railroad Equipment Trust of 1915, were sold at the beginning of the year. Under the provisions of the trust the following equipment was received:

3,500 all steel 50 ton automobile box cars
500 all steel 55 ton composite gondola cars
45 steel underframe 40 ton automobile box cars

On November 15, 1916, the Board of Directors authorized the execution of an agreement dated March 1, 1917, for the establishment of the Michigan Central Railroad Equipment Trust of 1917. This agreement provides for an issue of \$9,000,000.00 of equipment trust certificates, bearing interest at the rate of 4½% per annum, which amount is not to be in excess of 80% of the cost of the equipment to be furnished under the terms of said agreement. Certificates are to be paid in fifteen annual installments, the first installment being due March 1, 1918. On November 15, 1916, the Board of Directors authorized the issuance and sale of \$8,000,000.00 of these certificates at not less than 97% of par, the proceeds to be used in the purchase of 6,000 freight cars and 50 passenger and baggage cars.

During the year this company purchased \$153,000.00 of the \$250,000.00 First Mortgage 3% gold bonds of the Bay City and Battle Creek Railway Company, bringing this company's holdings of such bonds at par value up to \$201,000.00, which are to be cancelled, reducing the outstanding indebtedness, on account of this issue, to \$49,000.00.

On March 15, 1916, this company issued its one year promissory notes for \$4,000,000.00, bearing interest at the rate of 4½% per annum, and the 4½% notes, aggregating \$4,000,000.00, which matured March 2, 1916, and March 15, 1916, were retired.

During the year this company surrendered to The Toronto Hamilton and Buffalo Railway Company the second mortgage bonds of that company of a par value of \$357,000.00, in exchange for 3,570 fully paid shares of its capital stock, increasing this company's holdings in capital stock of The Toronto Hamilton and Buffalo Railway Company to 9,842 shares.

Under date of February 1, 1916, this company jointly and severally with The Canada Southern Railway Company, The New York Central Railroad Company, and The Canadian Pacific Railway Company entered into an agreement to guarantee the principal and interest of consolidated mortgage bonds of The Toronto Hamilton and Buffalo Railway Company to an amount not exceeding \$10,000,000.00, at a rate of interest not in excess of 5% per annum. In accordance with further provisions of this agreement this company has subscribed and paid for \$250,000.00 of such consolidated bonds at 90% of par.

In the operation of the Pension Department, 44 employees were retired and placed upon the pension roll. Of these retirements 26 were authorized because of the attainment of seventy years of age, and 18 because of total and permanent physical disability. 22 pensioners died during 1916, and at the close of the year 277 retired employees were carried upon the pension rolls. The average monthly pension allowance to these employees was \$22.08, and the total amount paid in pension allowances during the year was \$74,111.82.

SUMMARY OF FINANCIAL OPERATIONS AFFECTING INCOME

	1916	1915	Increase or Decrease
OPERATING INCOME	1,861.77	1,803.00	58.77
RAILWAY OPERATIONS	miles operated	miles operated	miles
Revenues	\$46,418,790.11	\$36,540,665.12	\$9,878,124.99
Expenses	30,646,260.72	25,727,487.11	4,918,773.61
NET REVENUE FROM RAILWAY OPERATIONS	\$15,772,529.39	\$10,813,178.01	\$4,959,351.38
Percentage of expenses to revenues	(66.02)	(70.41)	—(4.39)
RAILWAY TAX ACCRUALS	\$1,686,010.06	\$1,522,935.96	\$163,074.10
UNCOLLECTIBLE RAILWAY REVENUES	10,349.90	4,640.76	5,709.14
TOTAL	\$1,696,359.96	\$1,527,576.72	\$168,783.24
RAILWAY OPERATING INCOME	\$14,076,169.43	\$9,285,601.29	\$4,790,568.14

	1916	1915	Increase or Decrease
NONOPERATING INCOME			
Joint facility rent income.....	\$225,376.79	\$233,443.89	—\$8,067.10
Income from lease of road....	274.67	.....	274.67
Miscellaneous rent income.....	5,107.55	3,705.25	1,402.30
Miscellaneous non operating physical property	1,787.00	1,533.72	253.28
Separately operated properties —profit .....	.....	610.33	—610.33
Dividend income	476,081.25	469,425.50	6,655.75
Income from funded securities	46,739.17	47,600.00	—860.83
Income from unfunded securi- ties and accounts	180,069.73	170,797.39	9,272.34
Miscellaneous income	1,457.23	1,367.07	90.16
TOTAL NONOPERATING INCOME	\$936,893.39	\$928,483.15	\$8,410.24
GROSS INCOME	\$15,013,062.82	\$10,214,084.44	\$4,798,978.38
DEDUCTIONS FROM GROSS INCOME			
Hire of equipment—debit bal- ance	\$2,274,352.38	\$1,566,500.95	\$707,851.43
Joint facility rents	587,972.75	535,479.00	52,493.75
Rent for leased roads.....	3,259,907.22	3,444,650.66	—184,743.44
Miscellaneous rents	1,961.49	10,491.72	—8,530.23
Miscellaneous tax accruals....	2,466.01	2,249.62	216.39
Separately operated properties —loss	27,464.44	16,283.69	11,180.75
Interest on funded debt.....	1,768,138.09	1,389,594.52	378,543.57
Interest on unfunded debt....	225,804.00	316,799.94	—90,995.94
Amortization of discount on funded debt	22,704.00	.....	22,704.00
Miscellaneous income charges..	4,856.25	5,076.97	—220.72
TOTAL DEDUCTIONS FROM GROSS INCOME	\$8,175,626.63	\$7,287,127.07	\$888,499.56
NET INCOME	\$6,837,436.19	\$2,926,957.37	\$3,910,478.82
DISPOSITION OF NET INCOME			
Dividend appropriation of in- come (4%)	\$749,520.00	\$749,520.00	.....
Appropriated for investment in physical property .....	.....	.....	.....
Additions and betterments..	1,459.19	4,110.57	—2,651.38
Additions and betterments— leased lines	143,000.04	109,065.64	33,934.40
Capital stock purchased:			
Jackson Lansing and Sagi- naw RR Co.	1,151,150.00	.....	1,151,150.00
Grand River Valley RR Co.	405,375.00	.....	405,375.00
Miscellaneous appropriation of income .....	.....	.....	.....
To equipment depreciation account	500,000.00	.....	500,000.00
TOTAL APPROPRIATIONS	\$2,950,504.23	\$862,696.21	\$2,087,808.02
INCOME BALANCE TRANSFERRED TO CREDIT OF PROFIT AND LOSS ..	\$3,886,931.96	\$2,064,261.16	\$1,822,670.80

Profit and loss account

AMOUNT TO CREDIT OF PROFIT AND LOSS DECEMBER 31, 1915	\$13,638,974.45
ADD:	
Surplus for the year 1916.....	\$3,886,931.96
Refund of Federal excise tax overpaid for year 1911	11,990.48
Sundry adjustments and cancellations (net)..	1,890.11
	3,900,812.55
	\$17,539,787.00
DEDUCT:	
Discount, commission and expenses, MCRR equipment trust of 1915.....	\$6,685.13
Discount, commission and expenses, NYC Lines equipment trusts of 1910 and 1913.....	4,922.25
Depreciation unaccrued prior to July 1, 1907, on equipment retired during 1916.....	266,113.80
Cancellation of interest accrued on advances to Detroit Terminal Railroad Company.....	57,513.13
Abandoned property	91,119.75
	426,354.06
BALANCE TO CREDIT OF PROFIT AND LOSS DE- CEMBER 31, 1916	\$17,113,432.94

The total gross revenue for the year was \$46,418,790.11, an increase of \$9,878,124.99, due principally to the heavier volume of traffic, incident to the generally prosperous business conditions during the year.

The total railway operating expenses were \$30,646,260.72, an increase of \$4,918,773.61. By groups the increases were as follows:

Maintenance of way and structures.....	\$633,160.09
Maintenance of equipment	909,998.58
Traffic	97,868.22
Transportation	3,010,874.52
Miscellaneous operations	131,245.19
General	135,627.01
Total	\$4,918,773.61

A dock is being constructed along the Detroit River frontage of this company's property between Third Street and Eighth Street, Detroit, on the Harbor Line. It is completed for about 1,200 feet, and filling has been done for about 400 feet. When fully completed there will have been reclaimed about 234 acres of valuable land.

The construction of a connection, near Harper Avenue on the Detroit Belt Line, with the North Yard at the junction of the Detroit Terminal Railroad is about completed. This will greatly relieve congestion on that portion of the belt lying between Belt Line Junction and Harper Avenue, and will open up a very valuable industrial district, which will be served exclusively by this line.

Under date of May 29, 1916, this company, together with The New York Central Railroad Company, Pere Marquette Railroad Company, Wabash Railway Company and the Detroit United Railway Company, executed an agreement with the City of Detroit providing for the separation of grades at various street crossings in the City of Detroit between Junction Avenue and River Rouge, the City to assume all abutment damages, and the railroad companies the entire cost of construction, which need not exceed \$200,000.00 in any one year.

The changes in the road and equipment account during the year, and as shown in detail on another page, were as follows:

The amount charged to December 31, 1915, was.....	\$56,339,648.87
Increase in road:	
Expenditures during the year.....	\$1,168,092.36
Increase account purchase of property of rail- roads as previously referred to.....	21,973,957.79
	23,142,050.15

Increase in equipment:

Cost of equipment acquired under trust agree- ments	\$6,330,711.92
Excess cost of new equipment purchased, and additions and betterments to equipment over value of equipment retired.....	321,771.13*
	6,652,483.05
Total amount charged to road and equipment December 31, 1916	\$86,134,182.07

The changes during the year in the account showing amount of improvements on leased railway property, and as shown in detail on another page, were as follows:

The amount charged to December 31, 1915, was.....	\$17,878,571.57
Decreased during the year by transfer of expenditures on property of leased lines purchased by The Michigan Central Railroad Company	15,818,135.07
	\$2,060,436.50
Expenditures during the year, for additions and better- ments—road	181,141.90
Total amount charged to December 31, 1916	\$2,241,578.40

The death during the year of two officers of the company is recorded.
Ora E. Butterfield, General Solicitor, died December 22, 1916, in New York City. Mr. Butterfield was connected with the law department of this company from 1896 until the time of his death. As local attorney and general attorney for this company and during later years as General Solicitor of all the New York Central Lines, in charge of Interstate Commerce matters, he rendered valuable and efficient service, and placed himself in the front rank of railway counsel in the United States. He was born at Brattleboro, Vermont, November 9, 1870, and his untimely death was a distinct loss to the companies he served so well.
Michael C. Coyle, Division Superintendent of this company at Bay City, died November 13, 1916. He was born at Angelica, New York, March 24, 1854, and began railway work as messenger on the New York & Erie Railway at the age of twelve. He entered the service of this company in August, 1874, as train despatcher, and during a continuous period of forty-two years faithfully performed his work in the different positions to which he was promoted.

The following appointments were effective during the year:
February 1st Adna K. Masters, Freight Claim Agent
February 10th Sheldon W. Brown, Assistant to the General Man-
ager
September 1st Henry Shearer, General Superintendent
September 1st William H. O'Keefe, Assistant General Superin-
tendent
September 14th Abraham T. Hardin, Vice President
Acknowledgment is hereby made to officers and employees for faithful and efficient service.

For the Board of Directors,
ALFRED H. SMITH,
President.

THE CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS RAILWAY COMPANY—TWENTY EIGHTH ANNUAL REPORT

To the Stockholders of

THE CLEVELAND CINCINNATI CHICAGO AND ST. LOUIS RAILWAY COMPANY:

The Board of Directors herewith submits its report for the year ended December 31, 1916, with statements showing the results for the year and the financial condition of the company.

The mileage embraced in the operation of the road is as follows:

	Miles
Main line and branches owned.....	1,687.87
Proprietary lines	126.09
Leased lines	207.58
Operated under contract	201.37
Trackage rights	164.00
Total road operated	2,386.91

The increase of 2.03 miles, compared with the previous year, is due to new line constructed for the Saline Valley Railway 3.18 miles, and an increase of .39 miles in trackage rights over the New York Central Railroad, Rockwell Junction, to Toledo, Ohio, partly offset by a decrease of 1.54 miles due to the discontinuance of the use of trackage rights over the Toledo & Ohio Central Railway, Berwick to Whitmore, Ohio.

A statement showing in detail the mileage of road operated will be found on another page.

There was no change in the capital stock during the year, the amounts authorized and issued to December 31, 1916, being as follows:

Preferred stock authorized.....	\$10,000,000.00
Common stock authorized	50,000,000.00

Total stock authorized	\$60,000,000.00
Preferred stock issued	\$10,000,000.00
Common stock issued	57,056,300.00

Balance common stock authorized but not issued, December 31, 1916	\$2,943,700.00
---	----------------

The funded debt unmatured outstanding December 31, 1915, was	\$100,527,798.70
--	------------------

It has been increased during the year as follows:

Central Grain Elevator Company five per cent mortgage bonds assumed in connection with the acquisition of elevators at Cleveland, Ohio; Beech Grove, Indiana; Sheldon, Illinois, and Champaign, Illinois	\$237,000.00
Certificates issued under the Big Four Railway Equipment Trust Agreement of 1914.....	1,495,000.00
	1,732,000.00
	\$102,259,798.70

It has been decreased during the year as follows:

Equipment trust certificates payable June 1, 1916	\$258,000.00
Equipment trust certificates payable July 1, 1916	115,000.00
Pro rata equipment trust certificates payable November 1, 1916	246,689.81
Pro rata equipment trust certificates payable January 1, 1917	476,249.73
C I St L & C Ry Co general first mortgage bonds retired	71,000.00
C I St L & C Ry Co first mortgage bonds retired	6,000.00
Retirement of notes issued in part payment for equipment purchased under Big Four Equipment Trust of 1914	466,635.00
C C C & St L (St L Div) first collateral trust mortgage bonds purchased for sinking fund	34,000.00
	1,673,574.54

Total funded debt outstanding December 31, 1916 (detail on another page)	\$100,586,224.16
--	------------------

Under Big Four Railway Equipment Trust Agreement of June 1, 1914, there were contracted for, 25 locomotives, 1,000 freight train cars and 15 passenger train cars, at an estimated cost of \$2,186,500.00, and trust certificates issued to the total amount of \$1,495,000.00 to represent not to exceed 80% of the cost thereof. Of this new equipment, the locomotives, passenger train cars and 66 of the freight cars were received and put in service during the year.

The changes in the road and equipment account during the year were as follows:

ROAD:

Charges:

Adjustment of erroneous credit in October, 1899, account land leased to Dayton Union Railway Company.....	\$72,828.84
Cost of 100 shares of common stock of the Cincinnati and Springfield Railway Company, par value \$50.00, purchased during the year	100.00
Additions and betterments per detail on another page...	1,604,534.65
Total	\$1,677,463.49

EQUIPMENT (detail on another page)

Charges:

Trust equipment	\$1,014,433.51
Owned equipment	393,441.15

\$1,407,874.66

Credit account value of equipment retired....	1,809,219.65
---	--------------

Balance (credit)	401,344.99
------------------------	------------

Grand total (net)	\$1,276,118.50
-------------------------	----------------

Work was continued throughout the year under Section 19-A of the Act to Regulate Commerce which provides that the Interstate Commerce Commission shall investigate and ascertain the value of all property owned and used by railroad companies. The government forces completed the inventory of buildings, and the ascertainment of values of adjacent land by the same forces is about one-half completed. The latter work is being carried on also by the forces of the railroad company independent of the governmental investigation, and the company's engineering forces are making independent computations of the quantities of bridges, buildings, tracks and roadway in order to have a check of the government notes when the tentative valuation is complete. Complete maps and profiles of the entire line have been filed with the Interstate Commerce Commission, Division of Valuation, during the year.

SUMMARY OF FINANCIAL OPERATIONS AFFECTING INCOME

	1916 2,386.91 miles operated	1915 2,384.88 miles operated	Increase or Decrease 2.03 miles
OPERATING INCOME			
RAILWAY OPERATIONS			
Revenues	\$46,678,240.44	\$38,364,086.93	\$8,314,153.51
Expenses	31,221,976.50	27,528,366.76	3,693,609.74
NET REVENUE FROM RAILWAY OPERATIONS	\$15,456,263.94	\$10,835,720.17	\$4,620,543.77
Percentage of expenses to revenues	(66.89)	(71.76)	—(4.87)
RAILWAY TAX ACCRUALS.....	\$1,686,719.93	\$1,514,131.44	\$172,588.49
UNCOLLECTIBLE RAILWAY REVENUES	9,677.64	9,718.54	—40.90
	\$1,696,397.57	\$1,523,849.98	\$172,547.59
RAILWAY OPERATING INCOME.....	\$13,759,866.37	\$9,311,870.19	\$4,447,996.18
MISCELLANEOUS OPERATIONS			
Revenues	\$16,277.24	\$16,650.67	—\$373.43
Expenses and taxes.....	12,441.35	14,417.52	—1,976.17
MISCELLANEOUS OPERATING INCOME	\$3,835.89	\$2,233.15	\$1,602.74
TOTAL OPERATING INCOME..	\$13,763,702.26	\$9,314,103.34	\$4,449,598.92
NON-OPERATING INCOME			
Joint facility rents	\$463,873.72	\$440,946.93	\$22,926.79
Miscellaneous rents	186,885.37	149,955.76	36,929.61
Miscellaneous non-operating physical property	84,111.60	80,698.21	3,413.39
Dividend income	162,205.90	62,149.65	100,056.25
Income from funded securities..	281,278.02	229,674.03	51,603.99
Income from unfunded securities and accounts	67,778.48	67,607.58	170.90
Release of premiums on funded debt	1,191.78	.....	1,191.78
Miscellaneous income	50,318.39	103,803.18	—53,484.79
TOTAL NON-OPERATING INCOME	\$1,297,643.26	\$1,134,835.34	\$162,807.92
GROSS INCOME	\$15,061,345.52	\$10,448,938.68	\$4,612,406.84
DEDUCTIONS FROM GROSS INCOME			
Hire of equipment—debit balance	\$519,460.62	\$556,183.62	—\$36,723.00
Joint facility rents.....	562,562.76	562,779.10	—216.34
Rent for leased roads.....	571,041.00	571,041.00	.....
Miscellaneous rents	185,116.04	141,370.77	43,745.27
Miscellaneous tax accruals.....	456.07	423.80	32.27
Separately operated properties—loss	72,353.22	96,024.20	—23,670.98
Interest on funded debt.....	4,718,774.25	4,357,855.78	360,918.47
Interest on unfunded debt.....	79,313.62	731,254.00	—651,940.38
Amortization of discount on funded debt	10,165.30	16,538.66	—6,373.36
Miscellaneous income charges...	10,400.26	10,736.56	—336.30

	1916	1915	Increase or Decrease
TOTAL DEDUCTIONS FROM GROSS INCOME	\$6,729,643.14	\$7,044,207.49	—\$314,564.35
NET INCOME	\$8,331,702.38	\$3,404,731.19	\$4,926,971.19
DISPOSITION OF NET INCOME			
Income applied to sinking fund.	\$28,966.67	\$27,677.00	\$1,289.67
Dividend (3¼% on preferred stock)	374,943.75	.....	374,943.75
Income appropriated for investment in physical property.....	177,827.93	56,124.94	121,702.99
To equipment depreciation account	750,000.00	.....	750,000.00
TOTAL APPROPRIATIONS.....	\$1,331,738.35	\$83,801.94	\$1,247,936.41
SURPLUS TRANSFERRED TO CREDIT OF PROFIT AND LOSS.....	\$6,999,964.03	\$3,320,929.25	\$3,679,034.78
Surplus for year 1916.....			\$6,999,964.03
Amount to debit of profit and loss December 31, 1915.....			1,031,573.18
			\$5,968,390.85
ADD:			
Adjustment of sundry accounts (net).....			63,016.84
			\$6,031,407.69
DEDUCT:			
Unaccrued depreciation prior to 1907 on equipment retired during 1916.....			\$774,555.50
Property abandoned			92,479.71
Surplus appropriated for investment in physical property		17,363.39	884,398.60
Balance to credit of profit and loss December 31, 1916.....			\$5,147,009.09
The gross operating revenues for the year, \$46,678,240.44 were the greatest in the history of the company, being \$8,314,153.51 in excess of the previous year. Transportation revenue increased \$8,102,273.49 and incidental and joint facility revenues increased \$211,880.02.			
Freight revenue was \$32,536,543.61 an increase of \$6,025,711.41 or 22.73 per cent, due to prosperous business conditions which continued throughout the year.			
Total revenue tonnage carried was 32,902,583, an increase of 5,418,906 tons, of which increase 1,956,649 tons was bituminous coal, the remainder being distributed among the principal classes of articles transported. The average revenue per ton per mile was 5.56 mills, a decrease of .01 mill due to the proportionately greater volume of low grade tonnage and an increase in the average haul of 4.4 miles. The average amount received per ton of freight was 98.9 cents, an increase of 2.4 cents. Revenue train loading for the year was 654 tons per train mile, an increase of 65 tons or 11.04 per cent. Freight revenue per train mile was \$3.64, an increase of \$.36.			
Passenger revenue was \$10,026,741.54, an increase of \$1,512,052.09 over 1915. Of this increase \$821,710.52 was in interline and \$690,341.57 in local business. The average distance per passenger carried was 54.6 miles, an increase of 2.3 miles. The average amount received from each passenger was \$1.095, an increase of \$.048 and the average receipts per passenger mile were 2.007 cents, an increase of .006 cents.			
Mail revenue was \$900,666.66, an increase of \$71,216.31, due to the greater volume of business handled.			
Revenue from express traffic was \$1,331,473.27, an increase of \$378,760.13, or 39.76 per cent, principally due to this company's share in the revenue from the increased express business over its lines.			
Railway operating expenses for the year were \$31,221,976.50, an increase of \$3,693,609.74.			
Fluctuations in expenses for the year by groups were as follows:			
Maintenance of way and structures—increase.....			\$130,568.96
Maintenance of equipment—increase.....			1,199,179.18
Traffic—increase			152,289.88
Transportation—rail line—increase			2,105,915.62
Miscellaneous operations—increase			8,305.05
General—including Government valuation—increase.....			80,307.49
Transportation for investment—credit—decrease.....			17,043.56
Net increase			\$3,693,609.74

Maintenance of way and structures increased \$130,568.96, the principal primary accounts showing material increases being superintendence \$32,066.76, due to increased force and rates of pay; roadway maintenance \$69,341.53, principally due to greater expenditures this year in general cleaning and repairing of roadbed; bridges, trestles and culverts \$286,275.58, mainly on account of extensive renewals of structures in 1916; shops and engine-houses \$24,275.24, mostly due to the renewal of turntables at Bellefontaine, Ohio and Moorefield, Indiana, and power cables at Beech Grove, Indiana; maintaining joint tracks, yards and other facilities—debit \$54,125.90, extensive work having been done by other railway companies in the joint territories, Berwick to Toledo, Ohio, North Vernon to Jeffersonville, Indiana, and LaFayette to Templeton, Indiana. These increases were partially offset by decrease in ties \$258,383.97, other track material \$36,163.47, ballast \$27,195.85 and track laying and surfacing \$67,828.06, principally due to scarcity of laborers.

Maintenance of equipment increased \$1,199,179.18, principally due to increased cost of material and labor and a greater number of cars and locomotives repaired in 1916. There was also an increase of \$190,547.62 in depreciation on account of an increase in the rate from 2 per cent to 2½ per cent per annum.

Traffic expenses increased \$152,289.88, the principal items of increase being superintendence \$25,454.59, outside agencies \$67,745.72, largely due to the salaries and expenses incident to a number of newly created offices; advertising \$22,564.48 principally due to increased advertising matter necessitated by the creation of new agencies and offices; stationery and printing \$17,829.40, largely on account of tariffs; other expenses \$16,752.10, principally this company's proportion of the cost of the Ohio and Indiana rate study.

Transportation expenses increased \$2,105,915.62, of which \$1,095,895.17 was in payrolls. Fuel for locomotives increased \$543,200.99, principally due to an increased consumption of 261,442 tons. The balance of the increase extends to practically all of the accounts in this group and reflects the increases in tonnage, locomotive, car and train mileage, and increased rates of pay.

Of the increase in general expenses amounting to \$80,307.49, salaries and expenses of clerks and attendants increased \$14,239.99, law expenses increased \$12,960.58, the largest item being the expenses in connection with the arbitration of the case of the C C C & St L Ry Co versus the C N O & T P Ry Co for use of joint facilities at Cincinnati, Ohio, amounting to \$6,812.79; other expenses increased \$11,089.73 principally due to \$7,215.22 paid to employees while serving in the Federal Military service.

During the year there was charged to income the company's proportion of the deficit resulting from the operation of the Central Indiana Railway for the year amounting to \$49,600.09, or \$13,353.37 less than the previous year.

The operations of the Kankakee and Seneca Railroad (for which separate accounts are maintained) show revenues for the year \$108,739.87, operating expenses, taxes and additions and betterments \$137,314.41, deficit \$28,574.54, one-half of which, \$14,287.26, was assumed by this company and charged to income in 1916.

The Mount Gilead Short Line (for which separate accounts are maintained) shows revenues for the year \$6,472.80, operating expenses and taxes \$15,071.17, non-operating income \$132.50, deficit \$8,465.87, all of which was charged to income in 1916.

The net income for the year was \$8,331,702.38, an increase of \$4,926,971.19. Dividends aggregating 3.75 per cent or \$374,943.75 on the outstanding preferred stock of the company, were paid and charged against the net income. The surplus for the year was \$6,999,964.03, an increase of \$3,679,034.78.

The summary of financial operations affecting income includes the operations of the Peoria and Eastern Railway, Indianapolis, Indiana, to Peoria, Illinois. Separate accounts for this line are maintained, and the operations for the year 1916 show revenues amounting to \$2,345,245.85, operating expenses and taxes \$2,023,643.27, operating income \$321,602.58, non operating income \$396,710.16, gross income \$718,312.74, deductions from gross income \$765,473.22, deficit \$47,160.48. Sundry adjustments of profit and loss items resulting in a debit of \$25,073.67, were made in accordance with the operating agreement, which together with the deficit for the year was added to \$384,554.51 due this company for advances on December 31, 1915, making the indebtedness on December 31, 1916, a total of \$456,788.66.

In the operation of the Pension Department, 46 employees were retired and placed upon the pension roll. Of these retirements 27 were authorized because of the attainment of seventy years of age, and 19 because of total and permanent physical disability. 22 pensioners died during 1916, and at the close of the year 313 retired employees were carried upon the pension rolls. The average monthly pension allowance of these employees was \$21.65, and the total amount paid in pension allowances during the year was \$77,121.48.

Appointments during the year were as follows:
On January 1, Harry A. Worcester, Vice President and General Manager.
On January 1, Earl M. Costin, General Superintendent.
On June 15, William T. Stevenson, General Freight Agent.
On September 14, Abraham T. Hardin, Vice President.

Thanks and appreciation are extended to the officers and employees for their loyal and efficient service during the year.

For the Board of Directors,
ALFRED H. SMITH,
President.